

STIMSON'S JOURNAL-BOX AND DUST-GUARD.

careful railroad managers to the stern facts that every possible modern invention that is practicable in railroading ought to be applied and used, so as to protect the lives of passengers and reduce to a minimum the danger of traveling. In my trips over the country I have had many experiences, endured many delays, and suffered many annoyances, and in a future letter will outline them to you, provided this letter sees the light of day in the columns of your valuable journal.

SAMUEL OF POSEN.

[It is unfortunately a fact that the question of seats will not "down." Notwithstanding the marked improvements that inventors have made within a few years a large proportion of seats more or less uncomfortable to some class of people still remain in service. An English road (the London Underground we believe) has to run six classes of cars in each train, three grades of luxuriousness for non-smokers and a similar number for the smokers; possibly an equal variety of seats will be necessary to satisfy the American public. Even one of the most highly praised of recent new seats is complained of as too much resembling a "sleepy-hollow" chair, and the top of its back is said to crowd one's head too forcibly. The New York Central is certainly to be commended for its catholicity in trying all kinds; let us hope that the golden mean will soon be found and adopted. The Drummer evidently wants to recommend his own pattern of seat, but is too modest to name it. We will not undertake to defend the Eastern men against the charge of slowness; doubtless they would if cornered retort about the recklessness and extravagance of the West. We have not noticed the Boston & Albany windows lately and have not before heard of their unworkable window fastening. Possibly the refined and elegant surroundings in their new drawing-room cars with lunette windows are so satisfying to the senses that fresh air is deemed unnecessary and the windows are purposely made unopenable. The New York Tribune, not long ago, printed columns of discussion about who should control car windows and decide when they should be opened, when shut and when taken to headquarters as a subject of complaint. Perhaps the Boston & Albany wisely seeks to forestall further trouble in this line. "Judex" will, we fear, have to stick to common cars for some time to come. Drawing-room cars seem to be the slowest to "catch on" to the reform. The aim to be luxurious in appearance and to be different from the ordinary run seems to dominate in their design so far as seats are concerned. Some of the latest sleeping cars have new shapes in upholstery, but we have seen none that were any improvement on the old ones so far as comfort is concerned. We have described several good seats, and so do not know which one Judex alludes to. He should go into particulars more fully. The complaint that one can secure comfort by paying an extra fare and bribing a porter, but cannot get it in ordinary cars, is gradually losing its foundation, as roads are adding various accessories to ordinary cars which formerly were to be found only in the higher grade. The strifes of competition may yet reach the point of giving all the luxuries without extra charge. Lavatories are now common, and scented soap of a high grade is coming into use. The Montreal & Boston line over the Boston & Lowell and Canadian Pacific now has a buffet in the common car.—EDITOR RAILROAD GAZETTE.]

Journal-box and Dust-guard.

The Stimson dust-guard was exhibited at the Master Car-builders' convention three years ago, and since then it has been, as we are informed, in continuous experimental use on a number of railroads. Remarkable statements of its performance are given as follows: Continuous service on a passenger coach for one year without re-oiling, and on a freight car running 6,000 miles without re-oiling. The dust-guard is applied or removed at the side, keeping the top dust proof, by the simple mechanical contrivance shown in the engraving;

so that it can be easily reached and repaired without jacking up the car. The cost of the box adapted to this guard is not materially greater than that of an ordinary journal-box, as it needs but a slight change in pattern. Much of its success is, undoubtedly, due to the use of vulcanized asbestos bearing rings. This material (described in the *Railroad Gazette*, April 1, 1887, page 221) is already largely in use for piston-rod packing rings, and has a low co-efficient of friction, combined with the quality of permanently resisting heat, while it is as tough as horn and has great flexibility. Probably no material is better adapted to the peculiar service of a dust-guard ring and to the saving of oil and wear on the journal and bearing. We are informed that the device has been adopted by a number of railroads. Further information may be obtained of the National Railway and Street Rolling Stock Company, of Concord, N. H., who also have offices at No. 191 High street, Boston, and in the Grand Pacific Hotel building, Chicago.

Landscape Gardening on the Boston & Albany.

The first experiments of the Boston & Albany road in landscape gardening were made in 1882, at a suburban station a few miles from Boston. The next year the grounds at two other stations were put in order, since which time this work has been regularly carried on, until there are now more than forty stations at which improvements are going on, or have been completed.

The first attempts included a quite considerable horticultural display, but the present work is confined to the grading of the grounds, the planting of trees and flowering shrubs artistically arranged, with a few varieties of the most beautiful and hardy of native and foreign flowers and bulbs, in some cases perennial, and preferably free bloomers. They include tulips, crocuses, hyacinths, and the several varieties of barberry, coleus, cornus, deutzias, geraniums, hydrangeas, Japanese quince, privet, double flowering cherry, flowering plum, flowering thorn, five varieties of lilacs, spiraea nigella, etc. In tree-planting, rock-maples are most commonly used though a few silver maples and Norway maples, and a very few elms and some birches have been planted. For evergreen trees Norway pines and spruces are used. Climbing vines are planted quite freely about stations and other buildings, Ampelopsis veitchii, the several varieties of woodbine, clematis, passion flower, madeira, Japanese honeysuckle, and such like being selected.

In but two or three cases has any considerable sum of money been spent in such improvements, advantage being commonly taken of necessary changes of tracks or buildings to at the same time put the grounds in order. Thus it happens that the work has not been carried on in regular sequence, but has been prosecuted at such times and in such places as it could most economically or advantageously be done. The amount and kinds of other work going on has also had an important influence on the progress of these operations. The grounds at the different stations were for the most part acquired by the company many years since, and cannot now be readily enlarged, however desirable that might be, so that whatever is done in the way of improvement, must be limited by the size and shape of the land already owned by the company.

The first consideration in any given case will obviously be the position of driveways and other approaches by which carriages or foot passengers arrive at or depart from the station. These must be made as direct and convenient as possible, and at the same time so laid out as not to mar the general effect by the ugliness of their contour or incongruity with their surroundings. In every case there are some peculiarities which make it unlike any other, so that there is a great variety in the solution of this part of the problems. When the driveways the foot-walks have been definitely located, the next step is to take advantage of any natural topographical features of the locality—rocks, trees, water-courses, hillocks and valleys—which may be turned to advantage in the laying out or planting of the remainder of the plot. The treatment of the site must be so far in harmony with the general character of the surrounding country as to leave the portion under improvement still in imagination an integral part of it, which, while gratifying the eye, shall not offend by its conspicuousness. The special features introduced must be in harmony with this idea.

The general plan of the grounds at a station is to provide gentle undulating areas, as large as possible, of lawn grass, diversified by an occasional tree or plot of shrubbery arranged to give to the view as pleasing a variety as possible without enough of these last to appear in any way crowded. Where there are flower beds, they are some-

times set with the earliest of spring flowers, to be followed with the early summer varieties, and these by later ones, so to keep a succession of blossoms through the whole season. It is not always possible to begin and complete the work at a station in the same season, and sometimes the laying out of driveways and grading the grounds is all that is at first attempted.

The great saving of labor and cost of material has made it desirable to use quite small trees and shrubs, which are set very close together; these will be thinned out as they increase in size, those removed being made use of anywhere else that they may be needed. Up to this time the company has purchased the material used, but a nursery is now being established at Allston, which will be stocked in the beginning with about 100,000 shrubs and young trees, this number to be increased as need may require. They will be available for use in a few years. They are for the most part native to New England, and all are such as will thrive in the New England climate and on comparatively poor soil. Between stations along the road, the sides of cuttings are being dressed off to an even slope of $1\frac{1}{2}$ to 1 or 2 to 1, covered with loam, sown with grass-seed, and planted with shrubs down to the level of the rails. This will have a tendency to prevent these slopes from washing, so that a large part of the cost of doing this, will in a few years be refunded in the diminished expense of keeping the ditches clear. The slopes of embankments will in time be also smoothed off and planted with trees or shrubs, thus adding greatly to their stability.

The first improvements were made under the direction of Frederick Law Olmstead, but the later plans have been made by the engineers of the company, who have availed themselves of the valuable assistance of Mr. Sargent, Director of the Arnold Arboretum, under whose supervision or advice most of the work has been done. A small part of the labor required to keep the grounds in order is done by the employes at the station, the remainder being done by a small force of men kept for that purpose, less than a dozen of whom are employed for the whole road.

In some instances the work done by the railroad company has so stimulated local enterprise that a general improvement of the public grounds of a town or village has taken place, and has led to a largely increased interest in this subject.

This road has conclusively demonstrated that the vicinity of a railroad station is not of necessity the most barren and unsightly place in a town, but that by a small expense, under intelligent direction, it may be made one of the most attractive.

Premiums to Employes.

We have given in former issues an account of the premiums to employes given on many of the Continental railroads. Those of which we have heretofore treated have been premiums for economy in fuel and lubricants and of maintenance of locomotives. On many of them premiums are also given for regular time made by trains in running. The Northern, of France, and the State railroads of Belgium give a premium of from 0.5 to 1.1 cents a mile, in which the firemen share. Loss of time on the way forfeits the premium. In France generally, and on the state railroads of Austria-Hungary and the Northern of Spain the engineer and fireman receive a premium based on the time gained and forfeit for time lost. These premiums vary from two to 3.5 cents per minute, according to the train, on the Austria-Hungarian. On the Northern, of Spain, premiums are given for time made up which has been lost through unavoidable delays. This is also the custom on the French state roads. On the Western and Southern, of France, the premium takes the form of a fuel credit, and is based upon time gained, so much fuel being allowed per minute gained. On the Lyons road the system is more complicated. The basis taken is the possible speed of a train; that is to say, the speed that could be attained by an engine doing its proper work. This speed depends upon the class of engine, the profile of the section, the load, and atmospheric conditions. The premium then given and fines imposed for gained or lost time are based upon the difference between this theoretical time and that which has actually been employed in the journey. The premiums are 2, 6 and 8 cents, respectively, per minute, for freight, mixed or express trains. Of these premiums the fireman receives one-third.

Various premiums are also given. On the Grand Central of Belgium small premiums are given for mileage made. These are absolute and not dependent upon economies of fuel or time. The same is true on the Wurtemberg State Railroad and on the Northern of Austria and other Austrian roads, as well as on the Northern of Spain. In France such premiums are not given. However, on the Orleans system employes are paid extra at the rate of \$1.40 a day for enginemen and \$1 a day for firemen for all time made in excess of 22 days or 23 days in a calendar month. On the Orleans system and the state railroads of Austria-Hungary premiums are given to enginemen for instructions given to apprentices, and a few other premiums are given by various companies. Premiums are given chiefs and sub-chiefs of depots, officials whose functions correspond somewhat to those of superintendents of motive power and master mechanics. These premiums are ordinarily based upon the number of enginemen belonging to each depot, and are a certain percentage of the premiums which those enginemen have received.

From the nineteen administrations from which reports were received on this subject and which represent a length of over 30,000 miles, five companies give no premiums to their employes other than some gift at the end of the year. These are the English companies. On the contrary, of the 14 Continental administrations reporting, all give premiums, arranged on a somewhat scientific basis, and of greater or less value. Notably, they all give premiums for economy of

fuel and lubricants. After that the premiums for regular time in the movement of trains are most common. Premiums for maintenance of locomotives in service are less frequent than the preceding. Various companies consider that engineers should have nothing to do with the maintenance or repairs of their engines. Finally most of these Continental companies give premiums to the chiefs or sub-chiefs of depots, based upon those received by the engineers under their authority. The following table shows the percentage which the premium is of the total payment received by the various employes on French lines:

	Depo: chiefs.	Sub-chiefs.	Engi-neers.	Firemen.
Western	16 to 23	31 to 26	25 to 20	12 to 13
Northern	25 to 35	22 to 15	25 to 29	31 to 23
Eastern	35 to 41	32 to 27	50 to 35	25 to 22
Paris-lyons	5	47 to 38	13 to 10	16 to 14
Southern	47 to 40	46	33 to 27	18 to 59
Eastern	37 to 41	40	27 to 30	19 to 14
Paris-Orleans	19 to 25	22 to 26	20 to 18	12

The Wisconsin Central Iron Ore Dock.

The accompanying illustrations show the iron ore dock recently constructed at Ashland by the Wisconsin Central line. The work was started late in the fall of 1886, and completed in June, 1887, and consists of a pile and trestle approach 1,680 ft. long, the ore dock proper 1,404 ft. long, and an outer crib 50 ft. long, making the total length 3,134 ft. The width of the dock is 36 ft., and the height of the base of rail above the water 45 ft.

There are 234 ore pockets; 117 being on each side of the dock, placed 12 ft. apart, centres. Eight of these in which ore cannot be stored, are high pockets, for loading direct from the cars into the vessels. The remaining 226 pockets have a capacity of 125 gross tons each, making the total storage capacity of the dock 28,250 gross tons.

There was used in its construction 211,500 lineal feet of piling, 5,117,000 ft. B. M. of timber, 373,000 pounds of bolts, 73,000 cast iron washers, 1,380,000 pounds of iron and steel in hoisting apparatus, and 2,400 cords of stone filling. The accompanying drawings show the details of construction, and will need little explanation. It will be seen from the deck plan that there are two tracks on each side of the dock, but that the two tracks have but three rails, the middle rail being used by both. The turn-out from the main track to the inner track is about 78 ft. long. The middle rail is switched and is moved by a gas-pipe connection from the same stand that moves the points of the turnout.

As the Gogebic Range does not produce hard ore, the dock was built especially for handling soft ore, the pockets being built high and on a steep incline, a pocket of the softest ore frequently being emptied in less than five minutes, though the average time is somewhat longer. One hundred and seventeen chutes are placed along each side of the dock, one at each pocket. These chutes are of steel, and are equipped with an ingenious device, patented by Mr. H. G. H. Reed, formerly General Superintendent and Chief Engineer of the Milwaukee, Lake Shore & Western. By this arrangement one man can easily raise or lower a chute while a vessel is getting ready to change position, and much time is saved over that taken with the common geared windlass. The largest vessels on the lakes, having a capacity of 2,450 tons,

are able to load inside of four hours. Mr. Reed's windlass is shown in detail in the engraving.

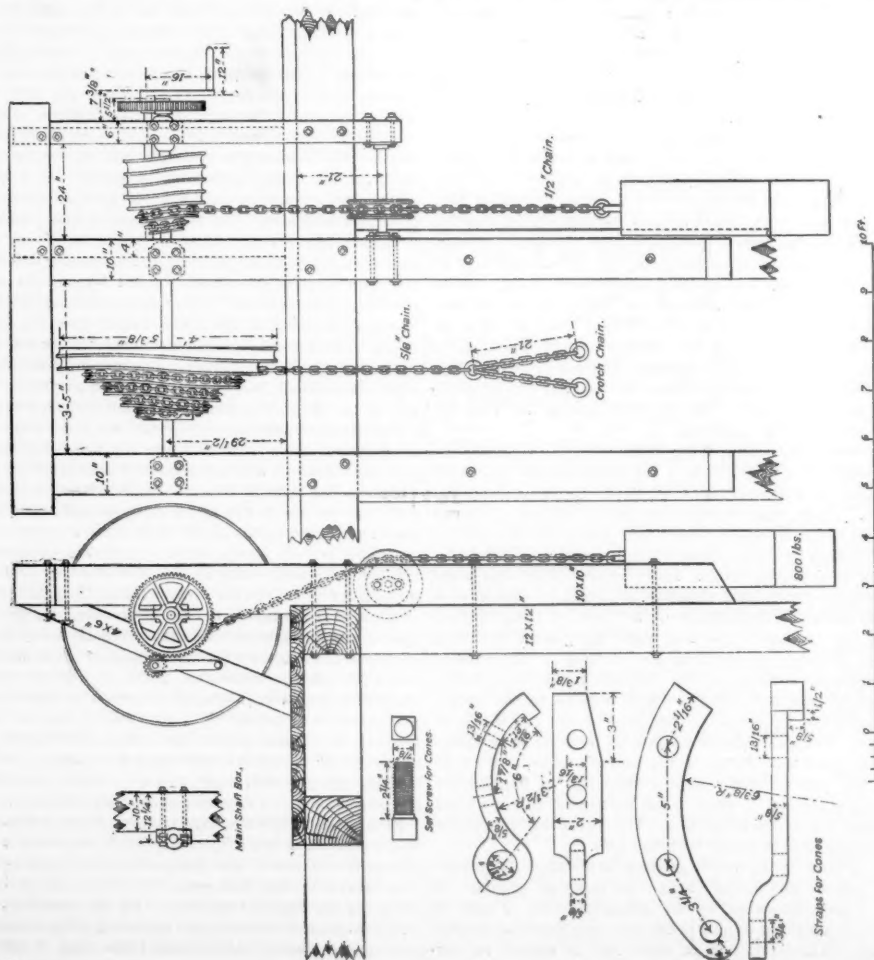
The ore cars used have a capacity of from 22 to 25 tons, depending on the variety of ore. These cars are 24 ft. long, out to out, and as there is a pocket every 12 ft., each car of an entire train can be placed over a pocket at once. The average length of time necessary to unload one car, after it reaches the dock, is two minutes; but to this should be added the time used in taking the cars on and off the dock and in switching. As the ore can be run into the vessels faster than it can be dumped from the cars into the pockets, the greatest working capacity of the dock is determined by the rapidity with which ore can be got on to the dock and dumped into the pockets.

With two engines placing cars and two crews unloading on each train they can unload an average of 30 cars an hour, or 720 cars, equaling 18,000 tons in 24 hours. The dock is lighted by electricity, so work can be carried on by night as well as by day.

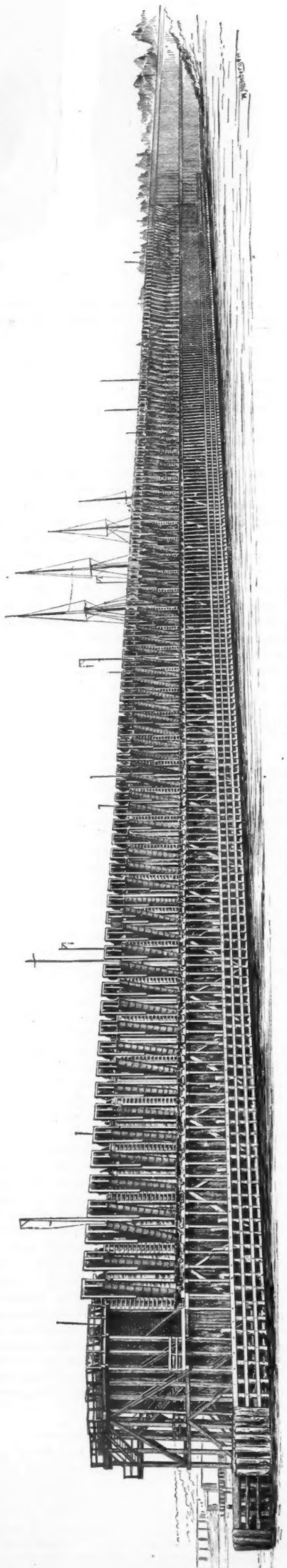
Opening of the Railroad Men's Building in New York.

A building, the beauty of which is an addition to even the up-town district of New York, and whose practical use and moral benefit go unquestioned, was formally opened on the evening of Oct. 3. The building was built wholly at the expense of Mr. Cornelius Vanderbilt, who has placed it in the hands of a board of trustees consisting of Cornelius Vanderbilt, F. W. Vanderbilt, Chauncey M. Depew, Charles C. Clarke, George H. Watrous, J. Pierpont Morgan, and John M. Toucey, all of whom are directors or officers of the roads using the Grand Central station; and the conduct and management of it will be under the direction of the Railroad Young Men's Christian Association, which now has rooms in the basement of the passenger station. Properly considered it is a club-house, appointed in a most luxurious way, but it will be also a source of comfort and an influence for education for those who are to use it. It will be a resort for the employes of the New York Central & Hudson River road, the New York, New Haven & Hartford, the Wagner Palace Car Co., the West Shore, and those of such other roads as may at any time use the Grand Central station.

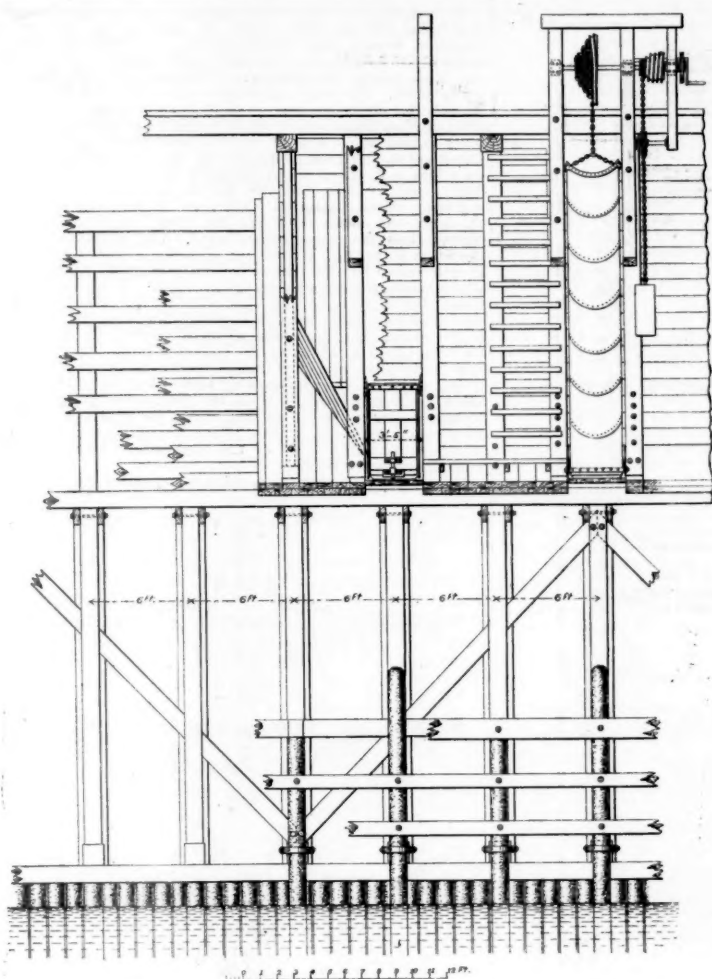
The building has been designed with thorough consideration for its uses. It stands at the corner of Madison avenue and Forty-fifth street, adjacent to the yard of the Grand Central station. It is built of brick and terra cotta, and is two stories high, with a tower 18 ft. square running up two stories higher. There are a gymnasium, bowling alleys and bath rooms in the basement, and a plunge bath 6 ft. deep, 9½ ft. wide and 13½ ft. long. The bath tubs are porcelain, the ceiling and walls of glazed brick and tiles. The partitions in the basement are of marble, set in a framework of solid bronze, and the plumbing work is nickel and brass. On the main floor is a library with 6,000 volumes on its shelves. Then there are a reading room, a social room, a General Secretary's room and committee room. In the reading room there are files of 95 daily, weekly and monthly papers. In the social room there is a piano. The floors here are tiled, and the walls are paneled in dark oak. On the second floor is the lecture and amusement hall, fitted up in



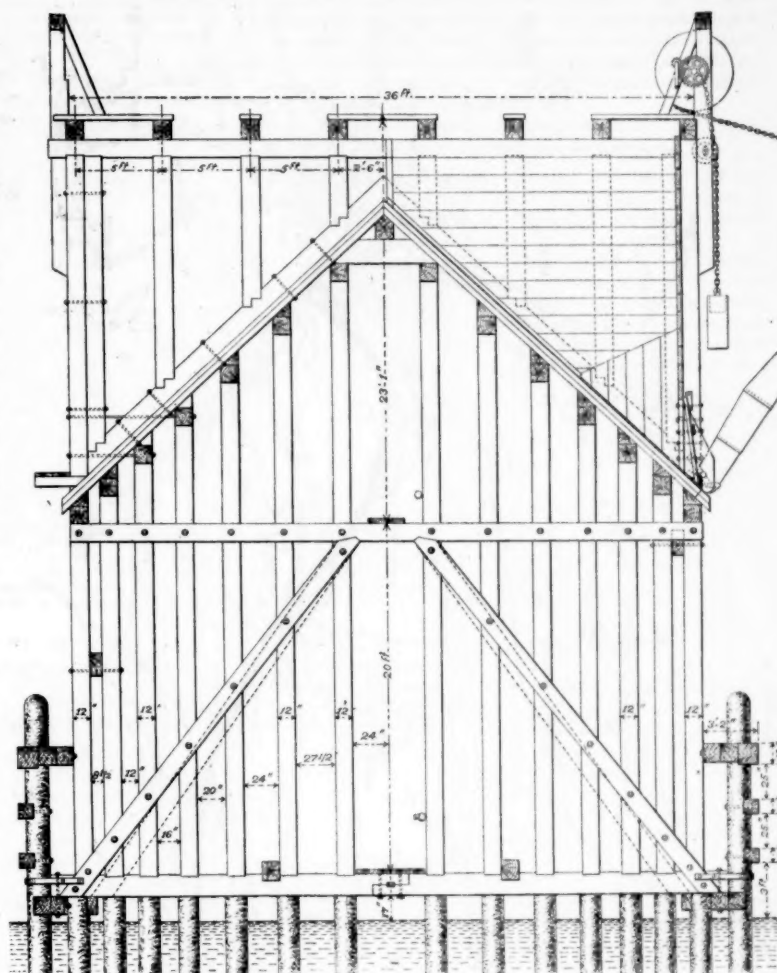
Details of Windlass, Ashland Ore Docks.



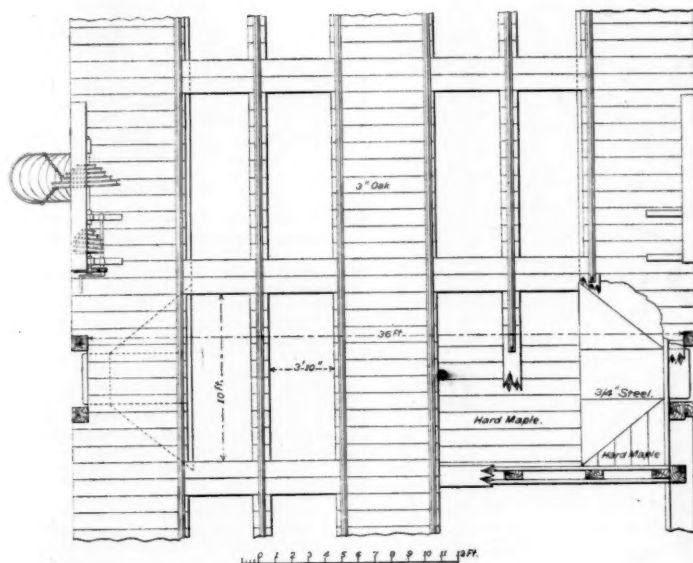
WISCONSIN CENTRAL IRON ORE DOCKS, ASHLAND, WIS.



Side Elevation.



Section.



Plan of Floor.

WISCONSIN CENTRAL IRON ORE DOCKS, ASHLAND, WIS.

polished oak and frescoed in light, pleasing tints. This hall will seat 400 people. The third floor is occupied by a thoroughly comfortable room, filled with leather-covered chairs and lounges, where the railroad men can have luncheon. Hot coffee is served free of charge. On the top floor there are ten bed rooms, furnished with brass bedsteads, which are intended for the use of railroad men, who, by reason of long runs, may be compelled to stay in the city over night. There is no charge for their use.

The whole handsome place was opened in an impressive and successful way this week. The occasion was in the nature of a house-warming, with cheers for Mr. Vanderbilt, prayer by Bishop Henry C. Potter and a speech by Chauncey M. Depew. A crowd which packed the building was present. Between the speech making music was furnished by a quartette from St. Thomas Church choir and a male chorus from the St. Mary's Glee Club.

Mr. Vanderbilt spoke as follows:

This building is now completed. We are met to-night for the purpose of welcoming the men for whom it has been erected and furnished. It will be under the control of a board of trustees, in which the several railroad companies entering at the Grand Central station will be represented. The trustees have granted permission to the Railroad Branch of the

Young Men's Christian Association of the city of New York to use the building for the benefit and enjoyment of persons in the service of the New York Central & Hudson River Railroad, the New York, New Haven & Hartford Railroad, the Wagner Palace Car Company, the Express companies, and of any and all companies that may be entitled from time to time to use the Grand Central station. The understanding is that such rules shall be adopted for its control as shall be in harmony with the purposes for which it has been founded, and for the maintenance of that order and conduct which will assure to those coming within its walls the largest participation in its privileges. Its practical management will be in the hands of committees composed of railroad employees.

While it is desirable that as many as possible shall become members, I wish it to be distinctly understood that all employees, whether members or not, will be heartily welcome here at all times. My earnest hope is that all railroad men will here find ample provision for amusement and instruction, and that this may be to them a pleasant place in which to rest and pass their leisure time, and that they will not hesitate to use it to the greatest extent. I have great pleasure in declaring the building formally opened.

After Mr. Vanderbilt had finished, Bishop Potter came forward and proposed three cheers and a tiger for him. The audience responded most vociferously. Then Mr. Depew advanced amid the loudest applause of the evening. "He needs no introduction," Mr. Vanderbilt said. The

President of the New York Central & Hudson River talked for an hour. These are some things he said:

As our chairman has stated, even an ordinary railroad president, not accustomed to public speaking, ought to be able to say something on an occasion which inspires the dignified Bishop of New York to propose and lead three cheers and a tiger. When the money of many has gone into corporations, when the distances are so great, the strain of relation so intense between capitalists and workers who do not know one another, unless the electric wires of human nature are kept in circuit, we are thrown into the midst of social discontent, of those revulsions which are the terror of sociologists, preachers and statesmen to-day. We haven't given attention enough to the question how these differences are to be healed. The man who strikes out a method to heal them, to bring the men and the heads of a great corporation closer together, is a public benefactor. This building stands to-day as one of the bridges, to show the chasm—which never shall be bloody—may be closed over.

You hear of the danger to the public weal from the men in the employ of railroads in the United States. But their record for law-abiding citizenship is equal to that of any other class. If our Legislature at Albany was composed of railroad men, instead of taking four months to pass laws, which it takes two months the next year to repeal, and all the time of the courts to interpret, the Legislature would pass its laws and adjourn in thirty days. Every good railroad man knows where chin should stop and work begin.

We don't want any discontented men around us. We want no sour and disgruntled men, but ambitious ones, who mean to be better mentally, physically, morally, every day than they were the day before. Many of you, no doubt, have gone along Fifth Avenue and felt envious of the fine club-houses there. I belong to five of the best and best-appointed clubs in New York, but I know of none so well-appointed as this. This one has cost more to the square foot than any in the city. The University Club is bound to have the best library among the clubs. But the library down stairs has twice as many books already as the University.

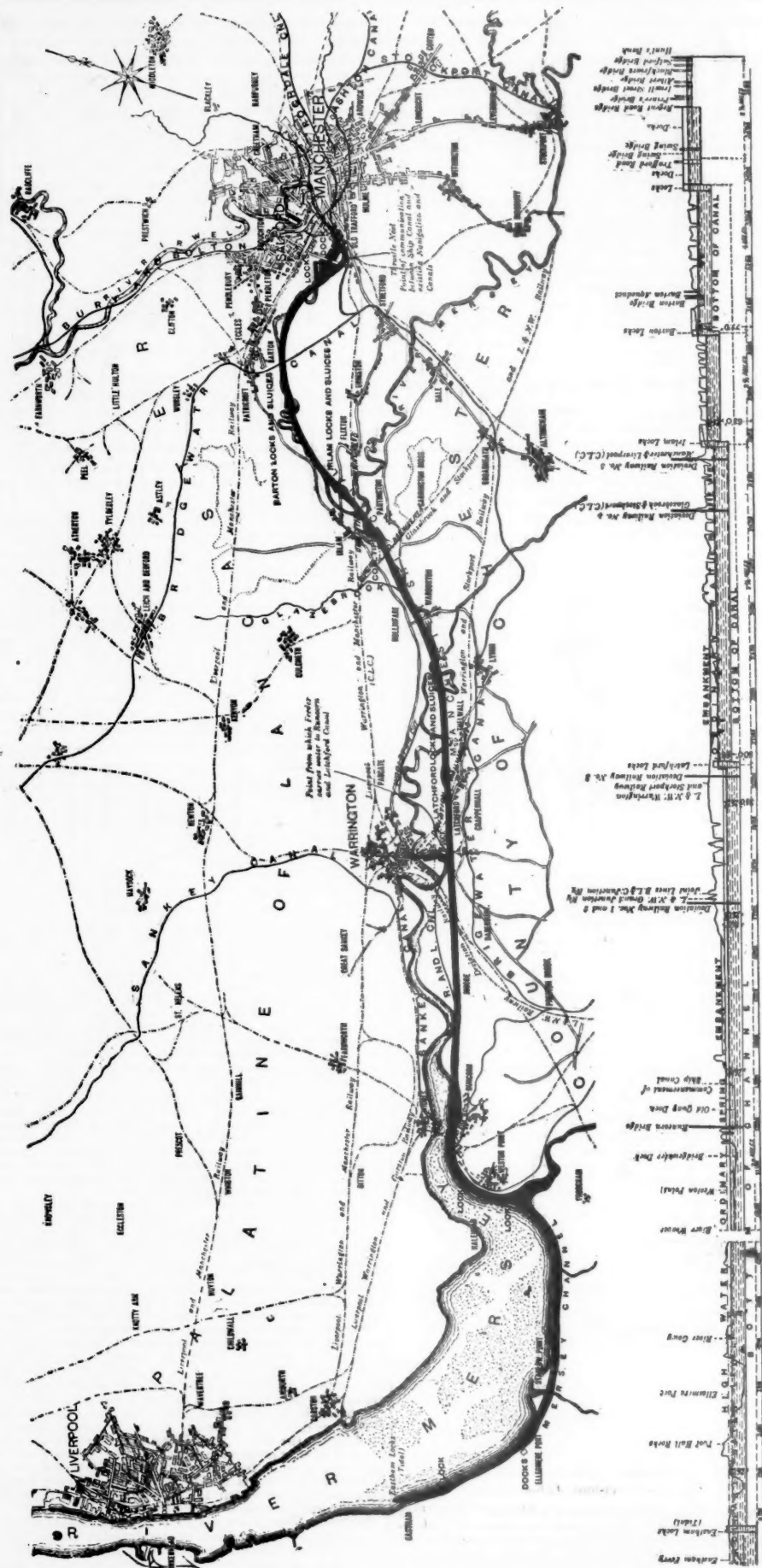
A building like this is a great stride in bringing employees up to the level on which both employer and employee walk together and both walk toward each other.

Cornelius Vanderbilt was the first man in this country who recognized the possibilities of development of the Railroad Branch of the Young Men's Christian Association. He took stock in it, and the fruit of his faith is shown in this building, the flower of ten years of work. Here surplus wealth is moving on the highest plane, and the example will reach out to other roads. The Pennsylvania, the Baltimore & Ohio, and the rest cannot stand still while the Central has this building in New York; and in ten years in every railroad centre will stand a building worthy of the purposes of this association, worthy of the giver of so noble a gift as this.

After the exercises a reception was held in the library.

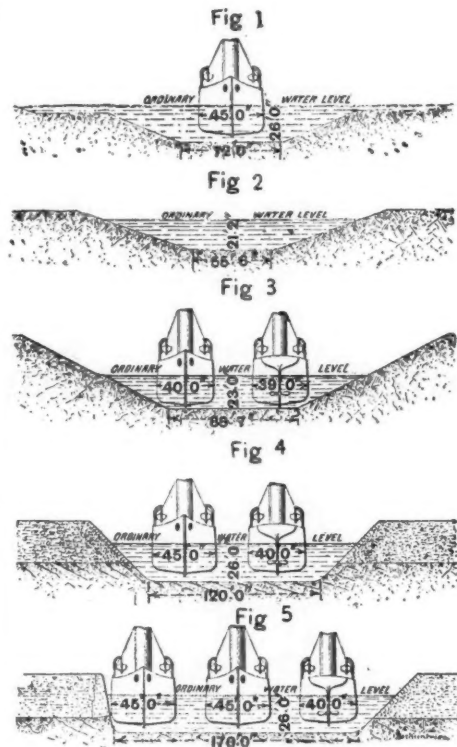
The Manchester Ship Canal.

The question of the construction of a ship canal between Manchester and the sea has been for many years past in the minds of the people of Lancashire. Notwithstanding the fact that Manchester possessed two large navigations to the Mersey estuary at Runcorn—one the Mersey & Irwell Navigation, carried out under an act obtained in 1720, and the other the Bridgewater Canal, made under the powers of the act of 1760—the increasing trade of the district seemed to demand larger and better facilities. Various projects were brought forward, but, until Mr. Daniel Adamson took the matter up in 1882, no progress was made. In that year the prospectus of the Manchester Tidal Navigation Company was issued, and a committee was formed to ob-



In designing the canal with entrance locks at Eastham, it was found that the canal might be kept at one level for a length of twenty miles to Latchford. At Irlam, about $7\frac{1}{2}$ miles above Latchford, locks were again required, and about $2\frac{1}{2}$ miles nearer Manchester, at Barton, locks will also be constructed. The last locks will be the entrance locks to the Manchester docks, making in all five sets of locks. The dock level at Manchester will coincide with the existing level of the river at that point, and as the fall from thence to the mean tide level at Eastham is nearly 60 ft., the average fall at each lock is 15 ft. At each change of level there will be three locks, side by side, the two largest being capable of taking large ocean steamers. The canal is designed to be 26 ft. deep—the same depth as the Suez Canal—and 3 ft. deeper than the Amsterdam Canal. The bottom width of the Suez Canal (fig. 1) being at present not more than 72 ft. it can only be navigated by one steamer, except at points where passing stations are provided. The Amsterdam Canal (fig. 3), being 88 ft. 7 in. wide at the bottom, allows two moderate sized steamers to pass each other at any point in the canal. The minimum width adopted for the Manchester Ship Canal is 120 ft. at the bottom (fig. 4). This will allow the largest class of steamers to pass at any point in the canal, which will be considerably widened at the locks, docks and other points to allow ships to turn; while from Barton to Manchester (a length of $3\frac{1}{2}$ miles) the width will be increased to 170 ft. (fig. 5), to enable a tier of shipping to moor alongside the Salford side of the canal without interference with the ordinary traffic.

The railways crossing the canal will be carried over by high



Typical Cross Sections.

Fig. 1, Suez; fig. 2, Ghent; fig. 3, Amsterdam; fig. 4, Manchester, minimum; fig. 5, Manchester above Barton.

level fixed bridges, and roads by swing bridges. The canal will be supplied by the waters of the rivers Irwell, Mersey, Bollin, and other smaller streams. Between Warrington and Manchester it will form virtually a canalized river, being an enlarged and straightened course for the rivers Irwell and Mersey. The length between Latchford and Irlam will mainly be fed by tidal water—the level of this part being about that of a moderate spring tide. When the tides are below this level, shipping will be locked in at Eastham; when it rises above the canal level, the gates will open, and the tide will flow through the locks up to the period of high water, when the gates will be closed. In addition to the locks, large sluice openings will be provided at Eastham to insure a low velocity of the tidal flow through the locks. The channel from the Sloine to the entrance locks at Eastham will be dredged to a depth of 8 ft. more than the deepest dock sill at Liverpool, and large steamers will be able to enter the Ship Canal at nearly all hours of neap tides, and also during the greater part of spring tides. Except at low water at spring tides, steamers and vessels of a smaller class will be able to enter the canal at all times.

The docks to be constructed in and near the city of Manchester will comprise some 62 acres, with a quay frontage of over $3\frac{1}{2}$ miles, and, of course, other extensive improvements of this nature are already projected along the route of the canal. For the illustrations and account here given we are indebted to *Industries*, the paper having been written by Mr. E. Leader Williams, C. E.

Per-diem Car Service.

The following is the circular issued by the Pennsylvania and Erie roads announcing their action concerning car service rates. The rates and conditions are substantially the same as those recommended by the Car Accountants' Association at Atlanta April 19 last. It will be seen that there is no exception made of line cars; they are apparently to be treated like all others. The car accountants recommended that "switched cars" be treated as though they were on the road which orders the switching done; but the present circular reverses the rule, being evidently based on the principle that a trip is a trip, however short, and that a road which hauls a car half a mile should be as fully responsible for the car and as much interested in its return as one which takes it a hundred miles. The Pennsylvania circular is on behalf of the Pennsylvania Railroad, the Northern Central, Baltimore & Potomac, Alexandria & Fredericksburg, Philadelphia, Wilmington & Baltimore, Camden & Atlantic, and the West Jersey. The Erie's is for all controlled lines. The Pennsylv-

tain a survey and estimates. At once great difference of opinion arose as to the practicability of carrying out and efficiently working a tidal navigation, carried up through a narrow artificial channel, and terminating at Manchester in docks about 90 ft. below the level of the land. There is a certain amount of fascination in the idea of bringing the sea to Manchester; but as the rivers Irwell and Mersey are greatly contaminated with sewage it is clear that, whereas weirs or sluices would pass off the land waters at once to the sea, tidal action would have brought back to Manchester every day a large portion of the foul waters of the rivers into the docks at Manchester. As a question of safe navigation, it also appeared that the quiet pounds of a canalized river would be greatly preferable to a narrow canal with strong tidal action. Again, too, placing shipping in docks greatly below the level of the city would always have led to large expenditure of power in raising the goods, whether done by direct lifts or by inclines. No cheaper artificial means of raising goods from one level to another can be found than by passing the cargo in bulk in the ships' hold through locks. The high banks of the canal in the tidal project would not have been so suitable for ship building yards or works of any description as a canalized river with a stream of low velocity

at a level perfectly adapted for the utilization of the adjoining land for works or side docks along its course.

After considerable opposition the plans of Mr. E. Leader Williams, C. E., for a locked canal were adopted. In 1893 and again in 1894 the project was defeated in Parliament. The failure in these two sessions was owing to the opposition to the proposed deep water channel in the centre of the Mersey estuary. The locked canal was to terminate at Runcorn, and a wide tidal channel was intended to be formed by training walls, and dredging between Runcorn and the deep water at Garston. This proposal was strongly resisted by the various interests on the Mersey, as tending to promote deterioration of the Liverpool bar by causing accretion in the estuary, and thus diminishing the amount of tidal scour. After two failures it was determined to adopt a plan to avoid, as far as possible, the powerful opposition shown, and to continue the locked canal on the southern or Cheshire side of the estuary to Eastham near deep water. The change in the plans of the canal increased its length and cost, but the advantages of directly placing Runcorn, Weston Point and Ellesmere Port on the canal, having a navigation safe at all times of the tide, and works of easier construction, fully compensate for any disadvantage attending the altered route.

vania lines west of Pittsburgh seem to have taken no action.

For the purpose of promoting a more prompt movement of freight cars, and preventing the unnecessary detention thereof, the following changes in the method of paying for their use will be adopted on these lines on and after Oct. 1, 1887:

First. The mileage rate shall be one-half ($\frac{1}{2}$) of a cent per mile and fifteen (15) cents per day per car for each day, Sunday included.

Second. The rate on four-wheel cars shall be one-fourth ($\frac{1}{4}$) of a cent per mile and seven and one-half ($7\frac{1}{2}$) cents per day.

Third. No per diem charge to be paid on cars delivered and returned the same day.

Fourth. Days to be counted from one day to another, that is, a car received on April 1st and delivered on April 5th equals four (4) days.

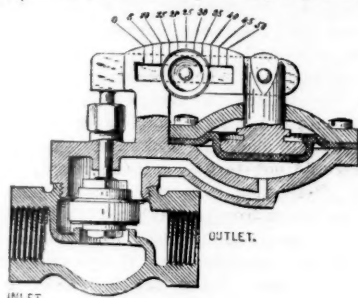
Fifth. The per diem charge on cars shifted by one railroad for another, for the purpose of receiving or discharging loading, shall be paid by the road on which the switching is done.

Sixth. The per diem rate shall be paid on cars in shops and on cars destroyed, until date of notice to owners.

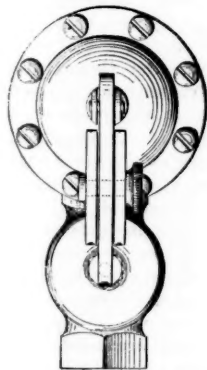
This company will be glad to interchange their cars with other railroad companies, who indicate their willingness to do so, upon the same basis; but until further notice will continue to interchange their cars with companies that do not adopt the new basis, upon the old basis of compensation.

The Keiley Pressure Regulator.

The Keiley pressure regulator is designed for continuous steam car-heating pipes. Its working may be clearly understood from an examination of the sectional drawing. The steam, at high pressure from the locomotive, passes through the open valve and impinges on the elastic diaphragm (shown at the right of the drawing), forcing up the right end of the lever, whose left end is correspondingly depressed, there-



Section.



Plan.

Keiley Pressure Regulator.

by partially closing the valve for admitting steam and accurately and uniformly regulating the pressure in the pipe attached to the outlet. The fulcrum of the lever is movable and adjustable upon a graduated scale, shown in the engraving, by means of which the exact pressure in the outlet pipe may be accurately regulated. The diaphragm is made to sustain a pressure of 500 pounds, and the regulator is so constructed that any part may be replaced at small expense.

Railroad Destruction as a Military Art.

The story of the part played in our war by the railroads has never been adequately written. The enormous advantage of the North in its more perfect railroad system at the start, increased as the war went on, and as the South found it impossible to replace the plant worn out and destroyed. One of the results of Sherman's march to the sea, most paralyzing to the confederacy, was the thorough destruction of the railroads as he went. General H. W. Slocum, who commanded the 14th and 20th corps, the left wing, in that famous campaign, gives in the *October Century* the correct method of destroying track.

Lest the most effectual and expeditious method of destroying railroad tracks should become one of the lost arts, I will here give a few rules for the guidance of officers who may in future be charged with this important duty. It should be remembered that these rules are the result of long experience and close observation. A detail of men to do the work should be made on the evening before operations are to commence, the number to be detailed being, of course, dependent upon the amount of work to be done. I estimate that 1,000 men can easily destroy about five miles of track per day, and do it thoroughly. Before going out in the morning the men should be supplied with a good breakfast, for it has been discovered that soldiers are more efficient at their work, as well as on the battle-field, when their stomachs are full than when they are empty. The question as to the food to be given the men for breakfast is not important, but I suggest roast turkeys, chickens, fresh eggs, and coffee, for the reason that in an enemy's country such a breakfast will cause no unpleasantness between the commissary and the soldiers, inasmuch as the commissary will only be required to provide the coffee. In fact, it has been discovered that an army moving through a hostile but

fertile country, having an efficient corps of foragers (vulgarly known in our army as bummers), requires but few articles of food, such as hard-tack, coffee, salt, pepper, and sugar. Your detail should be divided into three sections of about equal numbers. I will suppose the detail to consist of 3,000 men. The first thing to be done is to reverse the relative positions of the ties and rails, placing the ties up and the rails under them. To do this, Section No. 1, consisting of 1,000 men, is distributed along one side of the track, one man at the end of each tie. At a given signal each man seizes a tie, lifts it gently till it assumes a vertical position, and then at another signal pushes it forward so that when it falls the ties will be over the rails. Then each man loosens his tie from the rail. This done, Section No. 1 moves forward to another portion of the road, and Section No. 2 advances and is distributed along the portion of the road recently occupied by Section No. 1. The duty of the second section is to collect the ties, place them in piles of about 30 ties each—place the rails on the top of these piles, the centre of each rail being over the centre of the pile, and then set fire to the ties. Section No. 2 then follows No. 1. As soon as the rails are sufficiently heated Section No. 3 takes the place of No. 2, and upon this devolves the most important duty, viz., the effectual destruction of the rail. This section should be in command of an efficient officer who will see that the work is not slighted. Unless closely watched, soldiers will content themselves with simply bending the rails around trees. This should never be permitted. A rail which is simply bent can easily be restored to its original shape. No rail should be regarded as properly treated till it has assumed the shape of a doughnut; it must not only be bent but twisted. To do the twisting Poe's railroad hooks are necessary, for it has been found that the soldiers will not seize the hot iron bare-handed. This, however, is the only thing looking toward the destruction of property which I ever knew a man in Sherman's army to decline doing. With Poe's hooks a double twist can be given to a rail which precludes all hope of restoring it to its former shape except by rerolling.

Railroad Legislation in Illinois.

The following are abstracts of acts which were passed at the last session of the Illinois General Assembly and approved last June:

GRADE CROSSINGS.

When grade crossings of railroads are protected by interlocking signals or other "works or fixtures" such that it is safe for trains to pass without stopping, they need not stop, and all laws to that effect are repealed so far. But plans or drawings of the signals must be filed with the Railroad and Warehouse Commissioners, who shall first approve of them and have power to order them to be discontinued if in their judgment they are unsafe.

The Railroad and Warehouse Commissioners may appoint a competent civil engineer to examine the system and plans, and report for the information of the commissioners, and the commissioners are authorized to allow five dollars per day as a compensation for the services of the civil engineer, or such reasonable sum as they shall deem fit, and to allow such other and further sums as they shall deem fit to pay all other fees, costs and expenses to arise under said application, to be paid by the railroad company or companies in interest, to be taxed and paid or collected as in other cases. And the railroad and warehouse commissioners are also empowered, on application for their approval of any such system of interlocking and signals, works or fixtures, to require of the applicant security for such fees, costs and expenses, or the deposit, in lieu thereof, of a sufficient amount in money for that purpose, to be fixed by them.

GRAIN IN BULK.

In all counties of the third class and in all cities of not less than 50,000 inhabitants, in case of the transfer of grain, millstuffs or seeds from one road to another, the receiving road shall provide suitable appliances for unloading, weighing and transferring such property from one car to another without mixing, or in any way changing the identity of the property so transferred. It shall be accurately weighed in suitably covered hopper scales, which will determine the actual net weight of the entire contents of any car-load of grain, millstuffs or seeds at a single draft, without gross or tare. These weights shall always be given in the receipts or bills of lading and used as the basis of any freight contracts affecting such shipments between the companies and the owners, agents or shippers.

The practice of loading grain, millstuffs or seeds into foreign or connecting-line cars at the initial point, or the running of the original car through without transfer, shall not relieve the railroad making the contract to transport the same to its destination or connection leading thereto, from weighing and transporting the property in the manner provided.

Any violation of the provisions of this act renders the railroad company liable to a fine of from \$100 to \$500, and it is made the duty of the Commissioners to cause the act to be complied with, and to prosecute for violations of it.

ACCIDENTS.

It is made the duty of the Board of Railroad and Warehouse Commissioners to investigate the cause of any railroad accident resulting in loss of life or injury to person, which in their judgment shall require investigation. They shall report the result of the investigation to the Governor as soon as practicable, and also in their annual report. It is made the duty of the General Superintendent or Manager of roads to report any such accident immediately after its occurrence.

TRACK AND TRACK STRUCTURES.

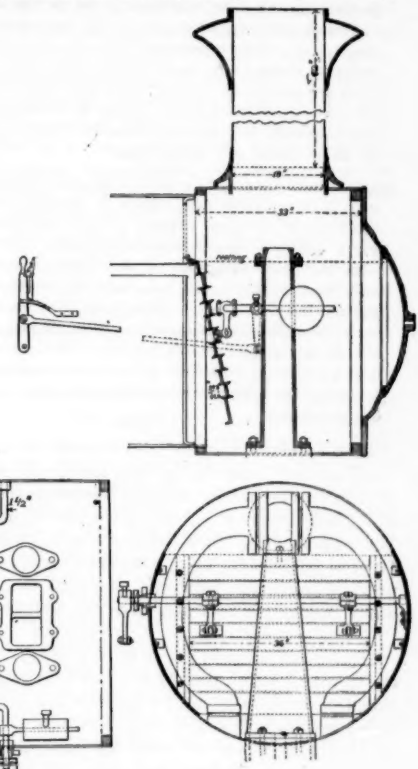
The duty is also imposed upon the Commissioners of inspecting such track, bridges or trestles as they may in any way learn to be unsafe or out of repair. They are authorized to employ engineers for such inspection. The Act does not, however, provide for the pay of the inspectors or for other expenses of inspection. The Board shall recommend repairs or rebuilding of track or track structures when they think it necessary, and the owners shall have opportunity for full hearing on the investigation or recommendation. Provision

is made for enforcing the recommendations of the Commissioners through the courts, and in any action the findings of the Board shall be *prima facie* evidence of the facts stated, and its recommendations shall be *prima facie* just and reasonable. Nothing in the Act is to be construed as destroying existing remedies or responsibilities.

Concannon's Register Diaphragm.

Two years ago, while Mr. Concannon was foreman of the Michigan Central roundhouse at St. Thomas, he equipped a locomotive with the device illustrated, intended to arrest sparks and burn black smoke.

The engine, having 18 x 24 in. cylinders, was running in passenger service on the Canada Southern Division, where it is still in service, and "doing fairly well, as compared with other engines." Mr. Concannon states that it has made an average of 32 miles per ton of coal, while engines of the same class, in the same service, average 28 miles. It dis-



Concannon's Register Diaphragm.

charges as few sparks as and less black smoke than locomotives with the extended smoke-box.

The diaphragm extends to within 6 in. of the bottom of the smoke-box. The five openings in it are regulated by a small lever in the cab. When the engine is working hardest these have to be open about three-eighths of an inch. Mr. Concannon set fire-brick the whole length of the fire-box with a 10-in. space over the furnace door. The first brick was set about 4 in. from the flue sheet, the others 3 in. apart. The smoke was burned better with the brick arranged in this way, although the locomotive has done excellently with no brick in the fire-box.

The diaphragm is made of cast-iron, half an inch thick, and the cost of fitting an engine with the device is small.

While the locomotive is still doing satisfactory service, the Michigan Central officers have not yet applied it to other engines.

Runaway Locomotives.

The following account of a runaway appeared in the daily papers of the 3d inst.: A special train on the Rome, Watertown & Ogdensburg ran into a switch engine of the New-York, Ontario & Western, near the eastern limit of Oswego. The engineer and fireman of the switch engine jumped. When the special struck it the throttle flew open, and the locomotive ran away, passing through the centre of the city and across the bridge to the west side of the river at a speed of about 70 miles an hour. In West Utica street it struck another locomotive completely wrecking it. The engineer jumped, but the fireman was caught in the wreck, and had a leg taken off. The runaway kept on at a fearful speed and met the Phoenix passenger train on its way to the station for its passengers. Both engines were badly smashed up and the coaches were also broken. Had the accident occurred ten minutes later the runaway would have met the passenger train on a high bridge. The engine crossed all the principal streets of the town. The extraordinary performance on the Pennsylvania in Philadelphia some weeks ago has been mentioned in a former issue, but the main facts may be restated: A shifting engine ran into a passenger engine (with no fireman on) hard enough to knock the engineer off senseless and throw the throttle wide open. The engine at once started at full speed, and a mile beyond struck another engine (with no fireman on) knocked another engineer off senseless, and another throttle wide open. The two engines went over the track together at their highest speed, with every condition present for a terrible catastrophe a few miles beyond, where they were sure to meet some train. Fortunately both were derailed before doing further damage.

Bridges in Canada.

The Quebec Government is aiding municipalities in the building of iron bridges. It has, however, imported a Belgian engineer for the work, much to the displeasure of the Canadians. It is feared that the government will place orders in Belgium for the material of the Chaudiere and other bridges.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

At the present moment the secretary of the Master Car-Builders' Association is unable to determine certainly whether or not the regulation for adopting the Janney type of coupler is carried or not carried. The vote is very close, with a slight probability in favor of adoption. Votes not yet received, and which may be received between now and Oct. 10, may easily change the result one way or the other.

The precise cause of the serious butting collision on the Chicago, Milwaukee & St. Paul, at Eagle Point, near Dubuque, Ia., Sept. 19, wherein five persons were killed, we are still unable to ascertain, though the accounts strongly indicate that the new uniform code had lately been adopted, and that the trainmen did not fully understand the differences between the new and the old rules concerning the meeting of trains. Train No. 3, going north, consisted of an engine and a car for the first section, and a regular passenger train for the second. Train 4, going south, was a regular passenger train. South-bound trains have the right to the road. Both were a little late, and were ordered by dispatcher's telegraphic order to meet at Peru. According to the uniform code this order would read "Trains 3 and 4 will meet at Peru," meaning all the sections of both, and we understand that it did so read. Apparently the men on No. 4 understood that the order meant only the first section of No. 3, as they proceeded on their way after they had had warning by whistle signal to observe the green signals on the first section of No. 3. There was a dense fog, and the trains met on a sharp curve.

We assume that the former code of rules required meeting orders to always name all the sections, and this is borne out by the newspaper statement, which, however, is not very clear, that the engineman of second No. 3 (the regular passenger) refused to move on the order until he had made inquiries of the dispatcher. If our premises are correct, the explanation is simply that the men had not carefully mastered their new rules. A Dubuque dispatch, which says that the new rules (meaning the uniform code) were in force, states that at the coroner's inquest 18 conductors and enginemen of the road testified that they would have taken the same action that Clark and Fales, conductor and engineman of No. 4, did. If this is so, and the uniform code is actually in use, it simply indicates the monstrous fact that there are eighteen conductors and enginemen there who are not fit to run trains. We take the more charitable view, however, that either they are misreported or else are trying to shield their brethren by allowing their sympathy to dictate statements which they know are stultifying.

The Time Convention at the Hotel Brunswick, New York City, next week, bids fair to be a well-attended and interesting one. Since the last meeting the roads have been looking at the work of the Train-rule Committee from a practical point of view; the contemplation of it with a view to putting it into actual service being a very different thing from sitting in a

convention and hearing it discussed as a sort of distant theoretical matter, and the interest will therefore doubtless be to many a much more real and vital thing than heretofore. The committee have continued their arduous labors and have a few recommendations to make, the most important being in the direction of securing more absolute uniformity in the adoption of the code by the various roads. After the painstaking labors of the committee, the form and wording of their rules should be carefully considered, and not departed from without grave reason; and their recommendations on this point should be well pondered. The disposition, apparent in some quarters, to be satisfied with a "substantial similarity" should be guarded against. Careless alterations of the standard code, under the impression that if the signal rules and a few others are identical, the remainder can be arranged in 'most any shape, will result in a waste of the committee's work. In the event of more work being mapped out for the committee, which is not unlikely, a serious question concerning the undertaking of it will arise, as the gentlemen who have so long borne the burden cannot afford to give their time indefinitely. Not only have they given their time to the exacting work without pay, but they all have duties at home which they cannot neglect at any price.

The accident on the Canada Atlantic, Sept. 26, seems to have been a particularly fortunate one. The elements of a disaster of the first magnitude were present. An express train of five cars, running at 40 miles an hour, was derailed in a forest fire. The cars turned over, took fire, and were quickly consumed; but no life was lost, and the injuries sustained were but slight. It is stated that the ties were burned at the place of derailment, and that seems to have been its cause. The train is said to have bumped along the ties for 100 yards, and to have finally quietly turned over on one side into the burning bush. There may be reasonable doubt of the speed, but that none of the cars were turned out of the line, and that the whole train kept along the track until it came to a stop would be remarkable at a much more moderate speed than 40 miles an hour. To this fact the entire escape of the passengers must in great degree be attributed. From the accounts received it appears that the trucks were equipped with the Gerhart safety attachment, and it is quite likely that this had its effect in keeping them in position parallel with the rails, and thus prevented the bunching up and crushing of the cars. After all reasonable allowances are made for the partiality of those who saw the accident, and attribute the behavior of the cars to the safety trucks, the case still remains a piece of valuable additional evidence in favor of check chains, or of something equivalent to them, or better. It cannot be known, of course, what would have been the result if the trucks had not been held by the check rods, but it is not supposable that they would have run 100 yards or 100 feet without some of them slewing around, leading to a more or less serious wreck of the cars.

Conductor Spettigue, of the fatal St. Thomas train, goes free, the Grand Jury having found no bill against him. This result is doubtless due to the feeling, which we have heretofore noted in juries in similar cases, that to punish one person where several others are plainly sharers in the guilt would be a considerable injustice. In this case the engineman was undoubtedly the most to blame, but even his blunder was not without mitigating circumstances. He had run an engine over this part of the road only once before, and there was, at a point a few rods before he reached the danger signal, a new semaphore, not yet in use, which indicated all clear. This might tend to mislead even a sober runner on a strange road, not to mention a tipsy one. For appointing to the train a new runner, and for allowing a "dead" signal to stand at "clear" so close to a danger point, the company was clearly responsible. It appears that the crossing was habitually passed by trains without coming to a full stop. The freight car next the engine had no air brake, but it had a train pipe, so that the brake (Westinghouse automatic) was connected through, but the evidence is conclusive that the reservoirs under the cars were all found empty immediately after the collision, so that doubtless the cock was shut or the couplings separated between the engine and the train. The fireman set the hand brake on the freight car before jumping from the train.

The statement is now made that at the time recently when four people were instantly killed by a train at a highway crossing on the New York, New Haven & Hartford at Five Mile River, Conn., gates

for the protection of the crossing were already in process of erection when the accident occurred. No such statement was made in the published accounts at the time, though it would doubtless have materially affected the public sentiment toward the road. We know nothing of the reasons which may have existed in this particular instance for speaking or for remaining silent; but the case is an example of many where railroad officers, for one reason or another, refrain from making public facts which would count in their own favor. The misconception and the carelessness with which the public generally meets advances are annoying, of course, and railroad men frequently hurt their own cases by saying too much; but the duty still remains on them as semi-public servants of making just and uncolored statements of facts, so that no one shall have a good excuse for forming adverse opinions.

Quite frequently, too frequently, in fact, we are called upon to record in our columns the case of a standing locomotive, whose throttle-valve has been opened by a shock, causing the locomotive to start and run "wild" until brought to rest by some external resistance. A few weeks ago, it was a passenger engine on the Pennsylvania, and this week it is a switching engine on the Rome, Watertown & Ogdensburg, as detailed in another column. If such accidents were necessary, or even excusable, we would simply record their occurrence, without comment; but they could easily be prevented.

As a general rule, when locomotives start of themselves, they are deserted temporarily by the runner and firemen; and if the attendants, before leaving the engine, were to place the link in mid-gear, the locomotive would not start, even if the throttle-valve was opened. Here, then, is a rule which should be enforced on all railroads: Whenever a locomotive is standing, place the link in mid-gear. Old and careful runners do this; and foremen should see that others follow their example. It may be stated, further, that the throttle-valves of locomotives, when properly constructed and adjusted, cannot be opened by external shock, so that the fact of such opening argues an improper design or imperfect adjustment. Generally speaking, locomotive throttle-valves are made so as to be locked when closed, and also in any position of opening, either automatically, by a spring latch engaging the notches of a sector, or by a screw controlled by the runner. The former arrangement leaves less to the discretion or watchfulness of the runner. But locking devices, like all other products of human skill, occasionally become inoperative, and require frequent inspection, to see that springs have the proper tension, that notches of the sector are not worn or broken, that screw threads are not stripped, etc. Still a locked throttle-valve, with reasonable care, may be trusted not to open by external shock, unless the shock should be so severe as to break the locking device, and even in this case, if the link is in mid-gear, no serious accident is likely to occur. There are some locomotive throttle-valves, too many, we fear, which are operated by a simple lever without any means of holding the valve, except the friction of the packing in the stuffing-box of the valve-stem. To fit up an engine in this way, and then to leave it without attendants and with the link down, is simply to invite disaster. Enough has been said, we think, to show that railroad officials, if they wish to avoid runaway accidents, which are nearly always costly and frequently fatal, have the matter in their own hands.

We lately heard a man say that he had discovered that truth was a commodity and he proposed to "finance" the idea. The commercial value of beauty is getting to be more and more understood by railroad companies, but the capital invested in that commodity goes rather into cars and large station buildings than into grounds. The account in another column of the work doing by the Boston & Albany in embellishing its station grounds will be read with interest by all who love beauty for its own sake, as well as those who think of its relations to railroad earnings. However desirous the directors of that company may be, individually, of making their road attractive to see, it is not probable that they would feel warranted in spending much of the stockholders' money in gardening, but for the expectation of getting it back in revenue. It is in the neighborhood of cities and large towns, of course, that such expenditures can be made with most profit; and it is surprising to see what a stimulus a pretty station is to the growth of suburban traffic; though the Boston & Albany's heavy through passenger traffic to New York City and to the West makes it particularly appropriate for it to beautify the whole of its road. Some of the most attractive natural scen

ery of this and other roads is at the points most remote from the cities, and doubtless there is a possible profit in preserving the harmony of the natural and artificial surroundings. Another practical side of the work of the Boston & Albany is the protection of the slopes of cuttings and embankments. In cuttings, particularly, there is the chance of economy as well as beauty in getting the slopes into grass. Many engineers have experimented more or less in this direction, and it would be for the common good if their experiences could be occasionally compared.

It is a pleasure to chronicle Mr. Cornelius Vanderbilt's generous provision for the comfort and welfare of railroad employes in the Railroadmen's House just opened. It is a practical recognition of the obligations of a great employer to the employed which cannot fail of its effect in their relations. The self-respecting working man wants his wages, and no charity; but further than that he wants the fact recognized that he is also a human being, with the same needs and tastes and feelings as the man who has a larger and surer income. Perhaps the most powerful influence to produce discontent among the American working-man has been the gradual growth of something like class distinction, or rather the growing habit of forgetting how very close the employers and employed in this country are in origin, breeding, education and all the early circumstances and conditions of their lives. Is it not absurd that when one farmer's boy becomes a director in a railroad he should think himself the social superior of the son of his less successful neighbor? Is it not absurd for the farmer's boy who goes to braking on a freight train to think and talk of his father's successful neighbor as a bloated capitalist and the natural enemy of labor? And yet such notions grow and spread, and show themselves constantly in harsh manners, bad service, sullen hostility and strikes. It is only from recognition of rights and obligations on both sides, and in remembering how closely knit are the interests and aspirations of all classes, that can be maintained that community of feeling without which the Republic cannot endure. Of course there are those who will think of the handsome club-house on Madison Avenue as a charity flung to inferiors; and there are those who will think of it as a poor attempt to return to workingmen a little of the wealth wrung from them; but fortunately these are but a small and not very important part of the people. Most men will see in it an expression of the common interest which should, and in the main does, run through our whole system of society.

The Pennsylvania and the New York, Lake Erie & Western roads have announced their willingness to interchange cars with any like-minded road on the basis recommended by the last Car Accountants' meeting, to wit, $\frac{1}{2}$ cent per mile run and 15 cents per day for each day absent from home. These roads, by this action, set an example which, it is to be hoped, will be widely followed. There would seem to be no good reason why a great many roads should not be ready to co-operate in making this experiment. Where the new system is adopted with only a portion of the roads dealt with, there will be some additional clerical work, and in a clearing-house this work would, doubtless, be considerable; but that should not be an obstacle to the introduction of so important a reform. The shorter roads will doubtless hang back, fearing that the longer ones, having a smaller proportion of shipments which require terminal work and delays, will get the better of them, but with rates so equitably fixed as these are, the mileage being calculated to barely cover the wear and tear of the car and the per diem charge being simply large enough to cover interest on cost, there ought to be no hesitancy, especially as there is no obligation to continue the system permanently. When once this combined system has been generally adopted the smaller the road and the better its control of its car movement the more likely will it be to gain from the change, for the natural motive of every superintendent will be to return every foreign car as soon as possible and to lend every one of his own that is not needed in home service.

The clause of the Inter-state Commerce law which requires ten days' notice of any increase of rates seems capable of producing a variety of complications. The rates on soft coal from Chicago to points in the Northwest have for some time been badly demoralized, the regular rate of \$1.75 to St. Paul having been reduced by successive stages to 95 cents. After the usual amount of blood-letting, some of the roads begin, of course, to move toward a restoration; accordingly, a meeting was called to consider the matter. But in advancing rates, time is, in a strong sense, money, and

as the ten days which must elapse before an advance can become operative would be a wearisome burden on the traffic men's patience, some of them took time by the forelock and announced the restoration to tariff as soon as the meeting was called, trusting to fortune for a favorable outcome. If in the meantime a new cut takes place, or if the meeting fails to restore harmony, the rates of course are not raised, thus rendering the notice deceptive to shippers and leaving things as uncertain as under the old regime. Physical diseases are much more easily diagnosed when they are decided and serious than when they show a complication of indefinite symptoms. Possibly it was partly in recognition of this fact, and not entirely because he was so successful with "fits," that the celebrated practitioner threw his patients into fits in beginning his treatment. However that may be, it would perhaps be better if the freight war disease could be at once precipitated to the worst stage and kept there until remedial action would be likely to be hearty and well sustained.

THE RECENT BRAKE TESTS AT BURLINGTON.

When the Master Car-Builders' Association and the Chicago, Burlington & Quincy Railroad Company planned the experiments with continuous brakes, with long trains at high speeds, they perhaps took the most important step in the perfection of railroading which has ever been taken, not forgetting the great contest of the locomotives when the Rocket set a pattern for the world; for the most imperative want of the great systems of railroads which have been developed by modern enterprise is an increased capacity for transportation. This can only be attained by an immense expenditure of capital; or at a less outlay, by a more rapid movement of the traffic, which demands a corresponding increase in the braking power, in order that the faster trains shall be handled with reasonable safety. The trunk lines, having equipped a few select cars for their fastest trains with the automatic brake had demonstrated by their experience the great benefit which might be expected if it were universally applied; and so brought about the very important brake trials at Burlington, which have finally resulted in the surprising performances of the Westinghouse train, of which we published some particulars in our last issue.

The first series of experiments at Burlington showed at once that previous results with shorter trains had given to the best observers, no adequate idea of the importance of the brake on long trains, nor of the quickness with which the brake must be applied over the entire train in order to avoid a disagreeable and even dangerous shock at the rear. The quickness of action demanded seemed indeed only to be attainable by the electric current.

Accordingly, when the trains arrived at Burlington for the second trials all minds might be said to have been interpenetrated with the belief that in electricity was our hope. Even the Westinghouse Company exhibited an electric attachment; and truly, the effect of the rapid application of the brakes which that intermediate agent secured may be said, without a pun, to have electrified the world. It seemed very doubtful at the time if air brakes alone could ever be so perfected as to work with the delicacy and precision obtained by the aid of electricity, or if they could be applied quickly enough for safe emergency stops with very long trains. Yet our readers will remember that we even then deplored the necessity, which appeared imminent, of a resort to electricity as an auxiliary in order to obtain the sufficiently prompt service of the force already awaiting its release, if a signal could only reach it quickly enough by its ordinary route. We expressed our hope at the time that the clumsiness and uncertainty of action which must attend upon any electrical combination might yet be avoided.

At the conclusion of those trials it is probable that there was only one engineer living who believed that the triple valve could be so altered as to stop a 50-car train, at 40 miles an hour, on a 53 ft. grade, in less than half the length of the train, without a shock or even the smallest movement of the slidometer. The inventor of the original triple valve, which so astonished the railroad world at the time of the first introduction of the automatic brake, saw at once the slight modification of his apparatus which would reduce the time of the application of the brake to a minimum, and without any opportunity for experiment on trains, he did immediately reduce the time required from about 17 seconds to about 7 seconds; yet, when he went to Burlington, near the end of the trials, and announced that he would certainly eliminate the shock in the emergency stops by the use of the air alone, he was listened to with incredulity by the best informed students of this great mechanical problem; still, as has

since become evident, he saw with the eye of reason that when the right conditions could once be determined by careful experiment, the desired result must certainly follow.

Fortunately for railroading, and so, for all mankind, these conditions have been determined, and the expected results do follow with the most constant certainty. The runs of 50-car trains over the now classic course at Burlington have been repeated and re-repeated in the presence of competent judges, who give assurance that there is nothing exceptional in the stops of which we published a brief table last week.

It has been conjectured that the new triple valve must be of marvelous delicacy; it is, in fact, not more complex nor essentially different from the one which has saved so many human lives, and averted so many accidents upon passenger trains during the long period since its beneficent introduction; and it may be confidently relied upon to act in its wider sphere with the same certainty that has characterized its action heretofore. The new triple valve admits of easy substitution in the place of the old one, rendering the apparatus hitherto in use conveniently convertible into the quicker acting form, which promises to benefit the passenger service almost immediately. The interchangeability of the cars equipped with the Westinghouse air-brake has been one of the most important of the advantages secured to the country by its use; and this will continue to be so, for the couplings between the cars remain of the present form and dimensions. The new triple-valve is not more costly than the old one.

Perhaps the quickness of action of the new form can only be apprehended by witnessing its operation. During the late experiments with the Westinghouse trains at Burlington, the rear car was connected with the engine by telephone so that the application of the brake at the engine could be distinctly heard in the rear car, and frequent attempts were made by expert visitors to time the interval between the application of the brake at the front and in the rear, one of the visitors listening at the telephone and the other holding the watch. No interval could be ascertained by this method, for as soon as the listener could announce that the brake had been applied it was heard to go full on beneath the observer's feet. In fact, the impulse which moves the triple, and which amounts to several pounds pressure per square inch, travels along the more than 1,800 feet of pipe in but little more than the interval of time which is required by the mechanism of the human body to receive an impression at the ear and to transmute it into an audible sound; but we must give credit to the air for having, during this brief space in which the human faculty has performed its one act, set in operation fifty triple valves successively. The interval required by the air for this performance has been otherwise accurately determined as a little less than two seconds of time.

We have long regarded the eminent services of Mr. Westinghouse to the railroads as sufficient to place him on a level with the foremost of those who have benefited the world by mechanical inventions; and we now tender to him our hearty congratulations on this new and most important achievement, whereby the necessity or even the desirability of an electric complication of the air brake is completely avoided; and at the same time we congratulate the railroad world on the acquisition of a perfectly efficient brake, operated by simple means, already in daily use and easily understood by all who have to do with it.

ENGLISH AND AMERICAN RAILROADS COMPARED.

Mr. Dorsey has hitherto had the field so much to himself that we gladly publish an argument on the other side, from an English engineer of ability and experience, who maintains: 1. That the high original cost of the English roads was not the result of lavishness, but of the necessities of English business. 2. That, taking the character of the service into account, the English roads do their work at less cost to themselves and to the shippers than the railroads of the United States.

He denies that the English engineers have wasted money to make their roads unnecessarily straight or level, and says that the grades of English railroads "are probably the worst of those of any country in the world excepting Switzerland, Peru and Norway." This is an interesting and rather surprising statement. We should be glad to hear further details on the subject, which is one where accurate information is somewhat difficult to find. The census gives figures for our own roads, and the International Railroad Statistics do the same for Continental Europe; but with regard to England we have been left in the dark by the authorities.

Mr. Dorsey obviously believes English railroad

grades to be easier than American; but it is unfair to him to imply that he makes this the overwhelming reason for their difference in cost. On pages 5-6, and again on page 45, he gives reasons quite similar to those advanced by our correspondent. The latter, however, makes two important additional points. First, that the expenses of parliamentary inquiry are not so wasteful as they seem, because these inquiries prevent the building of parallel roads. Thus while they increase the apparent cost *per mile*, they prevent waste of capital and produce good economy in the long run. Second, that the English roads have a large traffic in proportion to their mileage, and that therefore the expenses of equipment and terminals, not to mention dock and steamers, are all out of proportion to those of American roads.

The first point is a good one. The second must be accepted with more reserve. We are inclined to think that our correspondent overrates the difference in these respects quite as much as Mr. Dorsey under-rates it. The figure of \$62,000 per mile for American roads contains a pretty large sum under the heading "Stock in other Corporations," for which a deduction may be made quite as large as anything which England could claim for steamboats or docks.

But the more important question is, not why railroad cost so much, but what they have to show for it in the way of cheapness and economy. Mr. Dorsey believes that England is worse off in both these respects; our correspondent takes direct issue with him. He complains, and not without justice, that Mr. Dorsey fails to make proper allowance for difference in average length of haul in comparing the railroad charges of the two countries; but he at once goes to the other extreme in a set of figures where he gives England the full benefit of this allowance, without taking account of other differences which are, or ought to be, in England's favor. He makes allowance for length of haul, but not for density of traffic.

Other things being equal. The country which has the longer average haul will have the advantage in economy. And other things being equal the country which has the denser traffic will also have the advantage in economy. The United States has the former, England the latter. It is almost impossible to balance one against the other. Our correspondent seems to imply that dense traffic may not be an advantage. He points to the heavy terminal expenses of English companies which are due to the density of population; and seems to forget that these are but incidental drawbacks in the midst of the great economy which heavy traffic renders possible.

A terminus in the heart of a city will, of course, increase the *total* charges for station service, and it may possibly increase the cost of station service per ton or per passenger, but the large traffic which is thereby obtained so far diminishes the share of fixed charges and administrative expenses which each ton of traffic or each passenger has to bear, that it is a means of real economy to the railroad. Even if we grant that in some instances English traffic has become crowded beyond the point of maximum economy, American traffic as a whole is so far from having reached that point that in any general comparison between the two countries the difference in this respect is enormously in favor of England.

A failure to appreciate this difference in its various bearings leads to several serious mistakes. One of the most important and (to an Englishman) least obvious of these appears in the attempt to compare economy of freight traffic in England and America. Our correspondent says that the working expenses of American railroads are about 60 per cent. of the receipts; that the average receipts per ton of freight are 136.8 cents; and that therefore the average expenses per ton of freight are about 82.1 cents. Now any American railroad man will see, when he comes to analyze it, that there is not the slightest ground for that inference. In fact, the data furnish no basis for any inference whatever. But a man whose experience has been wholly or chiefly derived from a densely populated country would naturally assume that he could make no great mistake in treating the percentage of expenses to earnings as being the same in the passenger and freight business. This, however, as we all know, is far from being the case in America. As to what the respective percentages are there is no man in the country who can do more than hazard a guess. But the general impression is that the ratio of expenses to earnings in the passenger business is nearer 90 per cent. than 80, and that in the freight business it is less than 50 per cent. This one correction alone would practically wipe out the difference which our correspondent deduces in favor of English railroad economy.

We have dwelt on this point in detail in order to illustrate the danger of serious fallacy the moment we try to make any general comparison between two

systems so differently situated as the English and American. It is precisely here that Mr. Dorsey is most open to attack. His attempt to classify expenditures according as they are or are not affected by good or bad construction seems to us arbitrary and often misleading. But these general comparisons are not the best thing or the main thing in Mr. Dorsey's work. If he had omitted them altogether it would have awakened less popular interest, but its real force would not have been lessened. It is the detailed comparison of train expenses and train loads in their various relations to railroad economy which gives weight to the argument. To those who are best able to judge, this mass of figures is the argument.

A really useful counter argument must go over this ground. Detail must be met by detail. It must be shown that the returns with regard to train and locomotive service have been misinterpreted. It is probable that Mr. Dorsey has made some serious mistakes. In dealing with so wide a subject, at 3,000 miles distance, such mistakes are unavoidable. It is for English engineers to point them out; and when they do so, they will contribute much to the understanding of the subject, and to the advancement of true railroad economy on both sides of the Atlantic. But this has not been done. What we publish to-day is almost the first attempt at a serious answer, and this, while it challenges the general reasoning with some success, makes no attempt to meet the details. We say "no attempt" because the errors of detail which are singled out are quite noticeably irrelevant. It may affect Mr. Dorsey's reputation for careful writing to find that he refers to the period from 1871 to 1882, inclusive, as "eleven years," but it has remarkably little bearing on the question of locomotive performances during that period, as embodied in tabular statements. It may affect the popular estimate of his work to find some of his general inferences impeached, but the practical lesson of the book was not in its general inferences but in its details. The author may not have been always right, but his figures proved, or at any rate seemed to prove certain specific points; and on these specific points his argument still remains unchallenged.

The World's Wheat Supply for 1887-8.

For the six years from 1881 to 1886, an average European wheat crop has been about 1,211 million bushels, not 1,711 million as appeared by a typographical error in our article three weeks ago. The early estimates caused the quite general belief that the wheat crop of 1887 was very considerably above the average. The wheat crop of the United Kingdom was placed at 96 million bushels, against an average for the ten years from 1876 to 1885 of 81,500,000 bushels. The area under wheat in the United Kingdom for the crop of 1887 is officially reported to be 2,393,020 acres, which includes Ireland and the Channel Islands. From a large number of reports, from all parts of the Kingdom, it is found the yield is exceedingly irregular. It is now estimated by several authorities in London that the average yield per acre will not exceed 30 bushels, and that the aggregate yield will be no more than 71,790,000 bushels. Deducting quantity required for seed there would be left 66,405,750 bushels available for food and manufactures; the consumption annually of the population of about 37,375,000 is estimated at 208 million to 212 million bushels. The deficiency of about one million and a half of tons in the potato crop, as well as a marked deficiency in the oat crop of the Kingdom, may cause the wheat consumption to reach the higher quantity. The required annual imports of foreign wheat and wheat flour during the 12 months to end Aug. 31, 1888, may range from 136 million to 140 million bushels, some estimates being as large as 144 million.

The early estimates of the Austria-Hungarian wheat crop of 1887 indicated an available export surplus of 40 to 56 million bushels, but later and more conservative estimates place it at 16 to 20 million, and these are the last estimates of the Minister of Agriculture and of the Weisser Lloyd. The potato, maize and oat crops are deficient in Austria-Hungary, which may, perhaps, diminish the available export surplus of wheat.

The Italian wheat crop of 1887 is deficient to the extent of about 18 million bushels under average. The consumption of wheat in Italy is increasing. She imports wheat from British India (9,729,636 bushels in 1886-7), from Russia and Algeria. The wheat of Algeria is well adapted by its constituents for the manufacture of macaroni. Italy imported in 1886 34,410,238 bushels of wheat, and from Jan. 1 to June 30, 1887, 17,439,969 bushels of wheat, against 15,907,127 bushels the corresponding six months in 1886. Her requirements in 1887-8 may perhaps be as large or larger than they were in 1886-7.

Portugal and Spain have both deficient wheat crops in 1887 and will probably require larger imports of foreign wheat in this crop season than in last. Spain imports from both Russia and the United States.

The rye crop of Europe when averaged gives an aggregate production of about 1,100 million bushels. This year's crop is good in Austria-Hungary, Bavaria, Holland, Roumania and in Poland and Central Russia, but elsewhere is much below an average. The consumption of rye in Russia, Ger-

many and Austria-Hungary is very large. The Russian rye crop ranges from 550 million to 700 million bushels, and she exported in 1886 38,480,000 bushels of rye, against 44,406,400 bushels in 1885. Germany produces about three times as much rye as wheat, besides importing net between twenty and thirty million bushels from other countries. The deficiency in the rye crop of Europe and a deficiency in the potato crop of the United Kingdom, France, Germany and Austria-Hungary of seven to eight million tons, may cause a larger consumption of wheat. The oat crop in Europe is deficient this season, excepting in parts of Russia and in Italy.

The wheat exporting countries of Europe are Russia, Austria-Hungary, Bulgaria, Roumania and Denmark; the re-exporting countries are Germany, Belgium, Holland and France. Russia in 1887-8 may have a wheat export surplus of 60 to 65 million bushels. The wheat annually consumed in Europe is 160 millions to 175 million bushels more than the wheat production therein.

The European wheat crop of 1887 is mostly of fine quality, and has been in the main harvested in exceedingly good condition, fit for flouring immediately after harvesting, and although her reserve of wheat was very small, her requirements from other grand divisions of the globe need not be supplied, except to a limited extent, for eight to ten months hence; and for that period demand upon exporting countries may quite confidently be expected to be moderate, unless there arise political complications, which from the present outlook does not seem probable.

The United States had on July 1, 1887, an available export surplus of about 115 million bushels of wheat, of which about 20 million bushels will be required for the West Indies, East Indies, South and Central America, and the British North American Colonies. The exports from both coasts in the 12 weeks ended Sept. 24 have been about 42 million bushels. There is still a remainder available for export of 73 million bushels, of which about 15 million bushels will be required for the West Indies, etc., leaving available for Europe about 58 million bushels, which will probably all be wanted there by the end of the crop season, 1887-8.

The price is now abnormally low, the average of English home-grown wheat being for the week ended Sept. 17, 84 cents per bushel. The world's wheat supply for 1887-8 is probably ample to prevent any important rise in values, unless crop prospects in the spring of 1888 should be generally unpromising.

A synopsis of the annual report of the Nashville, Chattanooga & St. Louis is given in another column. The gross earnings are the greatest since the consolidation of the two component roads 15 years ago, as also are the net earnings. The operating expenses were greater in 1872-73, but never since. The gross earnings *per mile* were exceeded in 1880, as were the net earnings, but in no other year of the last 10 have these two items been so large as this year. The average percentage of expenses to earnings for eight years preceding and including 1886, has been 58.19. This year it is 56.90. Per train mile, the gross and net earnings have never been exceeded; the gross earnings are 16 per cent. and the net 24 per cent. above the average of 14 years. The earnings per ton mile were less than last year, therefore it is apparent that the average rates must have been less, and that the increased earnings and profits are due to increased business and to economy in working. The economy is probably in part due to the change of gauge in the year before that now reported on, but there is no evidence that business was increased thereby. That is, the change of gauge was but one element in the increase, and probably not nearly so important an element as the general prosperity of the country served by the railroad. Any extraordinary influence of the change would have been seen in the relative local and through business; but the local freight is about the same percentage of the total that it has been for five years—that is, about 44 per cent. of it. Before that, for eight years, the local freight was something like 57 per cent. of the whole.

We have received a copy of a complaint against the Philadelphia, Germantown & Norristown Railroad, made by the Executive Committee of the Commuters' Association, and addressed to the Attorney-General of Pennsylvania. The road is leased to the Philadelphia & Reading for 999 years from Dec. 1, 1870, for a rental of 12 per cent. per annum on the capital stock. This is the maximum limit of profit permitted to the road by the terms of its charter, or rather the limit is 12 per cent. per annum on the capital expended on the road. The dividends paid are \$269,628, or 12 per cent. on \$2,246,900; the rental is \$277,623. But the complaint sets forth that the capital expended is at most \$1,651,650, and that the difference between that amount and the stock on which dividends are paid is made up by 11,905 shares of stock issued in 1870 and 1874 as stock dividends. Further, the complaint sets forth that the net earnings of the Philadelphia & Reading on this leased line are 26 per cent. on its present share capital, or 35 per cent. on the stock and bonds before the issue of the stock dividend of 1870, or 39 per cent. on the probable cost of construction and equipment. As the earnings of the Philadelphia, Germantown & Norristown are not given in the reports of the Reading, the complainants estimate it as proportionate to the engine mileage. That is, given the net earnings of the whole system, the engine mileage of the whole system and the engine mileage of the leased line, the net earnings by the leased line are deduced by proportion. It is assumed that this gives a result really too small, as the traffic on the local line is mostly passenger and heavy. The fallacy of this assumption, however, lies in the fact that the receipts per engine mile from

freight and from coal are very much greater than from passengers, perhaps 30 per cent. more from freight and three times as much from coal. This is a rough approximation, but near enough to show the worthlessness of the estimate made of the net earnings of the leased line. This, however, is but one part of the complaint. The point that the dividends of the Philadelphia, Germantown & Norristown are more than 12 per cent. on its proper capital will very likely be an easier one to sustain than that the earnings of the Reading on that line are excessive. Other and simpler charges are that, whereas the act of incorporation permits the company to charge but two cents a mile per passenger and two cents a mile per ton, it now actually charges 2.94 cents per passenger per mile from Philadelphia to Norristown, and over seven cents per ton per mile for certain freights. In order, therefore, to secure compliance with the terms of the charter, the Commuters' Association appeals to the commonwealth. The outcome of this action of the commuters will be looked for with interest.

All superintendents complain that men will not obey orders; but not all of them give proper punishment and warn when disobedience occurs. All infractions of rules should be noticed, and if in any case they are not fully punished the leniency should be explained for the benefit of the whole force. Likewise all punishments should be made known to the "fellow servants" of the culprits, so that they may have the full benefit of the warning. If a man is discharged, and the reasons therefor are left to be spread by gossip, which may be more or less prejudiced or ignorant, wrong views will gain credence. Punishments should be inflicted only for good reason of course, and the reasons should be officially stated. If trainmen's waiting places were more generally adorned with such notices as the following, recently issued on a Pennsylvania road, and it were made certain that the men read them, there would at least be less excuse for disasters; and men who came to understand that the superintendent meant what he said in such utterances as these, would scarcely fail to have a more lively sense of their responsibilities. The three men here held up to public view were, we believe, all discharged.

CONTRARY TO RULES.

Sunday, a. m.—The last section of freight train No. 16 stopped on the main track just north of Post Creek depot to do some work on the engine after the train stopped. The conductor walked up to the engine without sending the flagman out. The flagman and a brakeman remained in the caboose until they heard a wild train coming. The flagman then started back and only got three or four car lengths in the fog when the engine passed him and collided with the train, injuring the engine, caboose and one car.

What should have been done.

The flagman should have left the train to go back when it was running not less than 8 miles per hour.

The conductor should have known that the flagman was back before he left the caboose to go to the engine.

The brakeman, knowing that the train was not protected, should have gone himself to protect it and reported the conductor and flagman for neglect of duty.

From the neglect of these three men the employees of the following train were liable to be injured or killed; and property was destroyed.

A prominent Western road now requires the rear brake man on some of its more important passenger trains to have had a year's experience as freight conductor, and pays him accordingly; that is, freight conductor's wages, about \$75 per month, we believe. This is a very sensible idea and deserves emulation on other roads, and application to other departments on all roads. It is, unfortunately, a fact that in increasing men's pay railroad managers generally take no thought of getting more or better service in return, except, perhaps, in the most vague and general way; and yet it would seem to be a most reasonable requirement, and one naturally to be thought of. Money spent in other directions is weighed very carefully to see if the return for it is equitable. If wages are below the average for equal service and requirements, they ought to be raised as a mere matter of justice; but in any increase above the customary rate, be it ever so little, the superintendent who does not at the same time demand an advance in efficiency is blind to his own interests. A promise of two or three per cent. advance in wages on certain conditions of increased intelligence or vigilance or industry would make men quickly alive to those conditions. The piece-work principle and the premium principle deserve much wider adoption. A road having few freight trains might find it difficult to graduate conductors fast enough to supply its demand for rear brakemen, but it is not by any means impossible to give men the requisite training without placing them on a freight train.

The leaving of passenger cars at way stations by cutting them from the rear of the train while in motion seems to have attractions to Europeans that it does not have here, where many regard it as somewhat dangerous. Mr. M. G. Corbeland, in the *Génie Civil* of Jan. 8 last gives a description of the arrangement for doing this on the Western Railroad of France, where it has been practiced on the express trains between Paris and Havre, which drop portions at two different places. With European compartment carriages some special apparatus is necessary, because the brakeman has to ride inside and the working of both hand and air brakes from the (outside) end of each vehicle as is done here would be out of the question. It is necessary to have the forward end of each car or string of cars to be cut off provided with a brakeman's box fitted up so that the trainman can apply the hand brake, open the air pipe and uncouple cars without going outside. The train has the Westinghouse automatic brake and the brakeman uses that instead of the hand brake in stopping the rear portion. He disconnects the

safety chains at the last stop before the cutting off, and is supposed to then see that everything is in working order. A pressure gauge is provided in the brakeman's box. Instructions are issued regarding the action to be taken by the brakeman if he cannot uncouple, and by the engineer if he finds it necessary to stop after the disconnection. It would seem, however, to be necessary that such instructions should be imparted with great care, as any irregularity in such an operation as this would be just the emergency where men would become confused. The practice of using the air pressure for stopping is, however, preferable to the American fashion of holding cars by hand, as in the latter way a collision is very likely to occur if a danger signal is encountered, because the engineer can, with the air pressure, stop the front portion so much more quickly than the brakeman can control the rear. The "flying" at the Grand Central Station in New York City would be much safer than it is if a very wide-awake brakeman with his hand on the air-brake valve were always posted on the front of the detached cars.

The corrected issue of the Southern Railway and Steamship Association's freight classification, which went into effect Oct. 1, stipulates that 24,000 lbs. shall be the minimum car-load weight for all kinds of freight except as otherwise noted; and the exceptions, other than bulky articles which have always been the subject of allowances, are very few; crackers, hollow ware, household goods, boilers and engines, and stoves being all that were noticed in a glance through the list. This is an indication of the large number of new cars added to the equipment of the principal roads within the last few years. The new ones capable of carrying 18, 20 or more tons each, together with those which have been strengthened with paint-brush truss rods doubtless bring the average capacity up to considerably above 12 tons. The more common the really strong cars become, however, the greater is the danger of overloading the old and weak ones still remaining in service. Careless shippers after getting into the habit of loading large quantities into a single car, put heavy loads into any car, and agents discovering the blunder after it is too late to conveniently correct it are tempted to risk the car on the road with too little margin of safety. Superintendents find it necessary to caution their car inspectors to be specially vigilant in looking out for over-loaded cars, and this vigilance will need to be kept up for a good while yet.

A suit for \$6,000 damages has been brought by an Indianapolis grain firm against the Indianapolis, Decatur & Springfield road on account of alleged discrimination by the issuing of an order that grain for the firm must not be taken unless prepaid. The dispatches do not give particulars, but it is to be supposed that the road had more or less reason for its action. The requiring of prepayment on all shipments is, however, a serious matter, especially in the case of goods of which the value is much larger at destination than at the shipping point, as it may disturb the regular customs of trade. Where there is any doubt about the ready salability of a commodity a freight carrier would doubtless be allowed wide liberty in making its regulations, but in the case of a staple article not likely to cause the road loss if left on its hands, most courts would probably pay less attention to the abstract rights in the case than to the requirement that all parties be treated substantially alike, regardless of any retaliatory action a road might desire to take toward individual customers.

We have commented before on the experiment of the Pennsylvania with English track. In our description of the London & Northwestern track, July 8, 1887, we stated that when first laid down only one screwed spike and one treenail were used, the other two holes in the chair being left unfilled to be used should the existing fastenings work loose. This practice, though usual on English lines, is not followed on the London & Northwestern, all the fastenings being used when the sleepers are first laid. The felt interposed between the chair and sleeper is found after nine years experience to prevent the usual cutting of the chair into the sleeper.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887, not before reported, is given as follows:

Chicago, Milwaukee & St. Paul, to Mosby, Mo., 34 miles since last reported; from Merrill, Wis., 29 miles since last reported; total, 63 miles.

Kansas City, Wyandotte & Northwestern, from Wyandotte to Valley Falls, Kan., 60 miles, 43 miles since last reported.

Kansas City & Pacific, from Grant Centre to Moran, Kan., 16 miles.

This is a total of 122 miles heretofore unreported, making 5,901 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles.	Miles.
1887.....3,901	1883.....4,629	1879.....2,507	1875.....903	
1886.....4,033	1882.....3,081	1878.....3,422	1874.....1,180	
1885.....1,825	1881.....5,340	1877.....1,548	1873.....2,597	
1884.....2,808	1880.....4,135	1876.....1,740	1872.....5,147	

This statement covers main track only, second or other additional tracks and sidings not being counted.

TECHNICAL.

Locomotive Building.

H. K. Porter & Co., of Pittsburgh, Pa., are operating their works to full capacity on light locomotives and street motors. They have just shipped a light locomotive for use on a plantation in Mexico.

The Car Shops.

The Denver & Rio Grande has given orders for 1,000 cars, 500 to the Michigan Car Co., and 500 to the Peninsula Car Co.

The Tyler Car Manufacturing Co. has organized in Tyler, Tex., with a capital stock of \$100,000.

Bridge Notes.

A union railroad bridge over the Ohio River at Wheeling, W. Va., is contemplated. A joint meeting composed of the Ohio County Commissioners, Wheeling City Commissioners, and Chamber of Commerce, appointed a committee of six to treat with John A. Lynch and R. H. Cochran, of Ohio, with a view toward raising a public subscription of \$50,000 for the bridge. The United States Government has approved the plans and given permission to erect the bridge.

The commissioners will build a bridge at Toledo, Ohio. The Duluth, South Shore & Atlantic will build a bridge at Conners, Minn.

Manufacturing and Business.

The business of the Crosby Steam Gage & Valve Co., of Boston, has had a steady growth since the company was formed, in 1875. The building on Oliver street, which it has occupied since 1881, is completely outgrown, and it has purchased land within the city limits, and erected a large and substantial factory, especially adapted to its needs. The main building is 125 ft. long and 45 ft. wide, three stories high, above a light and airy basement; an ell 70 ft. long and 46 ft. wide contains foundry, blacksmith shop and boiler room. It is supplied with all the best-known appliances for the prevention and extinguishment of fire. The rooms are of ample height and have abundant window space for the admission of light and air on all sides. This company is adding to its present large equipment a good many new machines and tools of special design and adapted to the particular requirements of its various products, many of which, like the steam engine indicator, the higher grades of pressure gauges, and other recording instruments, require the utmost nicety and precision in their construction. With such largely increased facilities for manufacturing its specialties, the company expects to be able to meet promptly all demands of the trade. The new building will be ready for occupancy about the middle of October. The salesrooms and offices of the company will remain at 95 Oliver street as heretofore. The contract for lighting Hyde Park, Mass., has been awarded to the American Electric Manufacturing Co.

The Wainwright Manufacturing Co., of Boston, with works at Medford, Mass., have made the following shipments of their corrugated tube exhaust feed-water heaters during the past month: 2 to Pittsburgh, 2 to New York City, 1 to Philadelphia, Boston, East Cambridge and Everett, Mass., Portland, Me., Seymour, Conn., Gloversville, N. Y., Catsaqua, Pa., and West Point, Va. Their corrugated tube expansion joints are also finding purchasers throughout the West and South.

The American Electric Manufacturing Co. has contracted to light the city of Lewiston, Me., with 100 arc lights of 2,000 candle-power each.

The Cleveland Motor Co. has been incorporated at Cleveland, O. Capital stock, \$250,000. Charles A. Brayton and others, incorporators.

The Armington & Sims Engine Co. has bought the Monohasset Mill property at Providence, R. I. As soon as the plant can be transferred the company will largely increase its facilities for building its engines.

A meeting of the Spiced Rail Joint Co., of Pittsburgh, Pa., will be held Oct. 11, to vote on a proposition to increase its capital from \$100,000 to \$500,000. The growth of the company's business requires more money, and it is probable a new steel mill for the manufacture of the invention will be provided for.

The Wilson-Snyder Manufacturing Co., of Pittsburgh, Pa., is building two Hydraulic Duplex Plunger Pumps 36 ft. x 21 ft. x 10 ft. x 30 ft., for the Homestead Steel Works of Carnegie, Phipps & Co., also one 25 ft. x 15 ft. x 36 ft. Duplex Plunger Pump for the Edgar Thomson Steel Works of Carnegie Bros. & Co.

The Queen City Electric Light Company, of Gadsden, Ala., is adding machinery to their plant for incandescent lights.

J. A. Burke, of the *Times-Democrat*, New Orleans, La., and others have chartered the Bessemer Electric Light & Power Co. Capital, \$50,000.

A company, known as the Bessemer Electric Light & Power Company, has been chartered at Bessemer, Ala.

Among the recent sales made by Currier & Snyder, Worcester, Mass., are one 20-in. and one 26-in. drill, each back geared and power feed, to the Washburn & Moen Manufacturing Co., Worcester; one 36-in. drill, back geared with power feed and with revolving table, to A. F. Bartlette & Co., East Saginaw, Mich.; to the Ohio Falls Car Co., Jeffersonville, Ind., one 36-in. and four 28-in. drills, all back geared, with power feed; to Pedrick & Ayer, Philadelphia, one 36-in., with revolving table, and to a dealer in the same city one 20-in. and four 25-in. similar drills; to Frazer & Archer, New York, two 36-in., one 20-in., four 25 in. and two 28 in. drills; to F. E. Reed, Worcester, one 25-in., and to Hill, Clarke & Co., Boston, one 25-in. drill.

The John Abell Engine & Machine Works, of Toronto, Ontario, have secured the right to manufacture the Reliance safety water columns, the patents for which are all owned by the Reliance Gauge Co., of Cleveland, O.

The Pennsylvania Co. has lately purchased of the Ball Electric Light Co., of New York, an electric lighting plant consisting of 130 arc and 300 incandescent lamps. The plant is now being installed in the shops and depot at Fort Wayne, Ind.

The Steel Tubular Car Co. has been organized to manufacture cars, railroad supplies, etc., with J. S. Orr, of Philadelphia, Pa., as President; Edward M. Marble, Washington, D. C., Vice-President, and John W. Post, New York, Secretary and Treasurer. The capital stock is to be not less than \$5,000,000 nor more than \$10,000,000. The company is now looking for a suitable site to erect works.

The new steam plant at the U. S. Mint, Philadelphia, has been completed, tested and accepted by the Government. The plant consists of three Galloway boilers, furnished by the Edgemoor Iron Co., Wilmington, Del.; three Buckeye automatic engines, built and furnished by the Kensington Engine Works, Limited, Philadelphia, Pa.; one 400 horse-power Kensington patent straight through tubular feed-water heater, built by the Kensington Engine Works, Limited; new and complete system of shafting, furnished by William Sellers & Co., Philadelphia. Wilson Bros. & Co. were the Government engineers.

The Union Indurated Fibre Co., of 110 Chambers street, New York, has just started another factory at Skowhegan, Me., for the exclusive manufacture of primary and secondary battery jars. These will be termed "Fiberite" jars. The material and treatment for this special purpose has been thoroughly tested, and one of the permanent storage battery companies pronounces it satisfactory in every way.

Messrs. Byram & Co., of Detroit, Mich., shipped 11 their "Colliu" cupola furnaces during the month of September.

A duplex air-compressor for Japan is included in this month's shipments of the Clayton Air Compressor Works of Brooklyn, N. Y., whose machines are now in use in Russia, Australia, Mexico, West Indies, Spain, Canada and most of the South American republics.

Iron and Steel.

The Champion Steel & Iron Co., of Springfield, O., has been incorporated, with a capital stock of \$100,000.

The Aurora Iron Works, Aurora, Ind., are pushed with orders and are running their mill 24 hours a day with eight hour turns. Arrangement to enlarge the works so as to double their capacity have been made, and the improvements and additional machinery are expected to be in place before Nov. 1.

The Eagle Rolling Mill and Tube Works of J. W. Friend & Co., at Pittsburgh, Pa., which have been idle for about five years, will soon commence operations. The preparations for resuming work are rapidly going on, and it is expected that within a month the works will resume operations.

For the week ending Sept. 10 the Bessemer steel department of the Bellaire Nail Works, at Bellaire, O., turned out 1,570 gross tons of billets, which is the largest single week's production in the history of the plant.

The Trussville & Cahaba River Land Co. has been organized at Trussville, Ala. It proposes to build iron furnaces, rolling mills and other similar enterprises.

The Wisconsin Malleable Iron Co., of Milwaukee, Wis., are building an addition to their foundry 200 ft. long, and putting up six more annealing ovens.

McLanahan, Smith & Co. Limited, proprietors of the Juniata Rolling Mill at Hollidaysburg, Pa., are erecting an additional heating furnace in the mill and will shortly commence the erection of five or six puddling furnaces.

The Rail Market.

Steel Rails.—The market is reported still dull. Some Eastern mills now quote \$35 for 1888 delivery.

Old Rails.—Quotations: Tees, \$22@22.50, and double-heads, \$23@23.50. There is some inquiry from the West.

Scrap.—A sale of foreign scrap was made at \$20.50; yard scrap is quoted at \$21@23.

Rail Fastenings.—Quotations: Spikes, 2 25 @ 2.40c.; angle bars, 2.10 @ 2.20c.; bolts and nuts, 3 @ 3.25c.

Steamer for the Central of New Jersey.

Cramp & Sons have accepted a contract from the Central Railroad of New Jersey for an iron steamer to ply between New York and Long Branch. The vessel will be 265 ft. long, with 3,000 horse-power engines of triple expansion. Work will begin at once.

The Anti-Magnetic Shield.

The *Railway Review*, in an article on the anti-magnetic watch shield, says that "it has actually happened that disaster has occurred because an engineer's watch was utterly ruined by riding on an electric street railway before going out with his train." The same account quotes Superintendent Wheeler, of the Chicago & Northwestern, as saying that the officers of that road had carefully investigated the merits of the magnetic shield and that their views are corroborated by Prof. W. J. Anthony, of Cornell University, as well as other electrical experts.

New York Harbor.

Lieut.-Col. Walter McFarland, Corps of Engineers, has submitted to the War Department his annual report upon the work of improvement of New York Harbor.

The report states that the survey of Gedney's Channel, finished June 21, showed that the channel has maintained the increased depth which it had received, and leads to the belief that the still greater depth which the act of Congress calls for may be equally maintained when once secured. All of the work of improving Gedney's Channel and the main ship channel is now in the hands of one firm, and the indications are that the work of deepening Gedney's Channel will be finished this year. The dredges will then be set to work on the main ship channel, the deepening of which is to be finished by the first of December, 1888. Under the present agreements 700,000 cubic yards of material will be removed from Gedney's Channel and 1,500,000 from the ship channel. This is said to be not much more than one-half the amount of material that must be removed in order to secure a depth of 30 feet at mean low water, with a width of 1,000 feet, and the removal of the remainder will cost \$540,000.

Colonel McFarland makes an earnest protest against the injury inflicted on the harbor by dumping into it the dredgings of the docks and slips and ashes and cinders from steam vessels, and instances cases where lumps and shoals have been formed in this way. All of the material dredged from the neighboring waters of New Jersey is dumped in Newark Bay, the Kills, and Raritan Bay, chiefly.

The sum available on July 1 for the improvement of New York harbor was \$742,293, and the amount that can be profitably expended during the next fiscal year is \$540,000 unless it should become necessary to resort to contraction works, which would cost between \$4,000,000 and \$5,000,000.

In the River and Harbor Bill of August, 1886, an appropriation of \$112,500 was made for continuing the work at Heli Gate. The amount was too small to admit working the dredge scow on the small reefs and continuing work on Flood Rock at the same time, and it was determined to apply it entirely to the latter purpose by increasing the width of the new middle channel by dredging a cut along its easterly margin to the full depth of 26 feet.

Work was begun with two machines in November, and continued until April 14, after which time one machine only was used, working night and day. The latter method of working has not, however, given as good results as working two machines by daylight only, the progress having fallen from 113 tons per machine per day of 12 hours to 59 tons. This decline in the rate of progress is partly to be attributed to the accumulation on the reef, after it has been worked over a considerable time, of fine material which is too small to remain in the grapple while it is being hoisted through the swift current. It has not been thought practicable, however, to use an ordinary dredging bucket to pick up this material, because scattered through it are occasional large masses which would soon destroy the bucket. The total amount of material removed during the fiscal year was 34,956 tons, leaving about 230,000 tons yet to be removed.

The Waldner Electric Brake.

At the recent trial of this brake near Cincinnati, a train of three passenger cars, one freight car and a caboose was used, all empty. On a down grade of 68 ft. per mile brakes were applied 330 ft. from a point where steam was shut off. The train was stopped in 32 seconds, 500 ft. distance. In a break-away trial the train was stopped from the caboose, at 800 ft. in 33 seconds. A graduation test was made, the speed being reduced from 30 to 15 miles and held. With a train of six cars and caboose the stop was made from 49 miles an hour, brakes being applied as before, 330 ft. from shutting off steam; time, 25 seconds, distance, 974 ft. Other trials were made with freight cars mixed in the train without brakes. These figures are from newspaper reports and may be corrected.

The Steel Rail Trade.

The condition of the Bessemer steel trade is not as satisfactory as could be desired, but it is far from being as demoralized as would appear from reports emanating chiefly in New York. The position is this: About 2,000,000 tons were contracted for during 1887, of which nearly three fourths have been delivered. Of the balance, postponement for about

50,000 tons has been asked for. This, with the apathetic demand for 1888, is somewhat discouraging, but there is no truth in the report that any of the mills are likely to shut down soon for want of orders. On the contrary, some have refused orders within the past few days, simply because they could not possibly fill them in the time required. As to next year's business, it is quite likely that the demand will not be as large as during 1887. Neither is it likely that prices will be as demoralized as some people are trying to make out. The combination which was formed in 1885 to regulate matters of this kind is still in existence, and if the demand is not likely to keep all the mills steadily at work, an arrangement will be made by which demoralization in prices will be avoided, by some of the mills restricting their output. In the meantime nothing of this kind has been arranged for, simply because it has not been necessary, but everything is in shape to meet the contingency if such should arise.—*Iron Age*.

A Long Cable Road.

The biggest and costliest cable project ever set on foot in Kansas City, Mo., is that of the Union Railway Co., of which B. F. Coombs is President, M. G. Harman Secretary, and A. M. Gould Attorney. The company proposes to build a cable line from the Chicago, Milwaukee & St. Paul bridge at Randolph to the heart of the city, making the line 13 miles long in all. The officers are now engaged in circulating petitions for right of way and have almost secured the requisite number of signers. The company is seeking a franchise from the city for the use of the streets, but as it happens to want the same streets as the Citizens' Cable Railway Co. wants there is a conflict.

Kansas City Tunnel.

The tunnel for the elevated road in Kansas City, Mo., has just been pierced through. The work was begun last May. Although the company prefers not to state the cost of the work, it has been variously estimated by engineers that when completed the tunnel will cost not less than \$500,000. It is 800 ft. long, beginning at a point about 100 ft. west of Washington street and gradually descending on a grade of 8 ft. to the 100 to the side of the bluff, facing the Bluff street bridge. The tunnel will be 22 ft. wide and 19 ft. high in the clear. The timber used in forming the braces for the ceiling and side walls has cost \$16,000. Over 2,000,000 brick will be required in the masonry work, and it will require fully 16,000 cubic yards of excavation to clear the tunnel. A gang of 65 men, both night and day, has been employed since the time the work was first commenced on May 10.

The Speed of Cutters on Cast-Iron.

The *Iron Industry Gazette* gives the following concerning the average speed of cutters on soft cast-iron surfaces, making allowances for changes in condition and character of work: In order to calculate accurately for milling work the speed of cutter and amount of feed per revolution must be observed; that known, the computation is as follows: Multiply the number of revolutions of cutter a minute by the length of feed at one revolution, and the product is inches a minute that can be milled. Allowing about 40 ft. a minute for surface speed of cutter, a $\frac{1}{2}$ -in. cutter should run at 300 revolutions a minute, with a speed of $\frac{1}{16}$ in. to a revolution, giving a result of 2 in. of light milling a minute. A 1-in. cutter would make 150 revolutions a minute, with a feed of $\frac{1}{16}$ in. on a moderately heavy cut, allowing $\frac{1}{16}$ in. of milling a minute. A 3-in. cutter would run fifty revolutions a minute, with a feed of $\frac{1}{16}$ in. on heavy work, giving a result of 1 in. of milling a minute. The above are examples selected from observed results in practical shop usage.

American Wood Preserving Co., of St. Louis.

This company is increasing the capacity of its plant. Its old works are devoted entirely to the treatment of material for street work by the zinc gyp-um process. The new cylinder which is now being placed in position is 100 ft. long by 6 ft. in diameter and will have a capacity of 350 ties per day. It is to be devoted to railroad work by the creosote process. The entire daily output of the works will equal 1,400 ties per day. A new branch of work which the company is about to take up is the preservation of lumber for car-building, by which it is expected to prolong the life of the body of cars by at least 50 per cent.

A New Bridge at Omaha.

A contract has been let to the H. S. Hopkins Bridge Company, of St. Louis, for the construction of an iron bridge over the Missouri river between Omaha and Council Bluffs. The only bridge now connecting the two cities is owned by the Union Pacific, which takes pedestrians and teams across on a "ferry boat" consisting of a very large, wide platform car. The present company has been formed by citizens who believe that competition will relieve the residents of Omaha and Council Bluffs of the excessive bridge toll, which is now the same as that paid for crossing the Mississippi at St. Louis. The Burlington's bridge at Plattsmouth, 17 miles south of the Union Pacific, affords no relief except to freight and passenger train traffic. The company is capitalized for half a million, under the title of the Omaha & Council Bluffs Railway & Bridge Co. J. T. Stewart is President; G. T. Wright, Council Bluffs, Vice-President; Guy C. Barton (Omaha) & Grant Smelting Works) Chairman Executive Committee; T. J. Adams, General Manager; Frank D. Moore, Engineer; J. H. Millard and Frank Murphy, directors. The structure is to be nearly a mile long, consisting of 925 ft. of iron viaduct on the west side of the river and 900 on the east side and connected by seven spans. One of these will be 400 ft. long, two will be 250 and four of 150 each.

The Electric Road at Port Huron, Mich.

The subjoined interesting particulars as to the Gratiot electric road at Port Huron, Mich., operated on the Van Depoele system, have kindly been furnished us by Mr. J. H. Talbot, the manager.

We are running a 40 h. p. generator with a 40 h. p. engine. The dynamo furnishes current for three motor cars, one car containing a 15 h. p. motor, the others each a 10 h. p. motor. Each car is able to draw a car along behind it. The current seems perfectly reliable and the motors work well. The cost of running the dynamo now is about \$3.75 per day to us, as we have let it out by contract. We had some trouble last winter on account of using the rails for the return current, as the iron of the wheel and rail must come into actual contact. We know now, though, that if we can do no better, we can get the contact by fastening a sharpened iron rod so it will scrape the rail. A great point in the way of economy is in substituting single wheel iron travelers for the elaborate ones first sent here. The expense of them is as one to twenty, and the efficiency seems equal. Our passenger receipts showed an average increase for June, July and August, 1887, over the same months of 1886 of 65 to 80 per cent., considerable of the increase being traceable to curiosity. We carried 1,500 people a day during those months.—*Electrical World*.

THE SCRAP HEAP.

Topographical.

From the *Tribune's* account of the President's journey westward it appears that "from Altoona the train began the descent of the west slope of the Alleghenies, toward Pittsburgh."

"The Sea Wall Final."

One night last week, at Pittsburgh, Mr. T. Cavan gave a dinner to a number of engineers in celebration of the completion of his contract on the Western Pennsylvania. From the accounts in the Pittsburgh papers it was a jolly affair, and they called it the "Sea Wall Final." Mr. Theodore Low, in a little speech, explained why. "In 1876 Mr. Cavan built a sea wall for the government, which they expected he would finish in 12 years, taking the work on the new Pittsburgh post-office as a standard. He finished it in 75 days. The government could not understand how a man could complete a 12-year job in 2 months, and did not pay him for the work until a few weeks ago—just 12 years after the work was done. In official circles this is called the final estimate. Mr. Cavan has been engaged since last December in changing the last 5 miles of the West Penn road at Leechburg from a high grade to a low grade line. For the past 5 years he has been working along the entire road, making these changes. In addition, he built 2 bridges across the Kiskiminetas river, which are regarded as great feats of engineering. His last contract, which involved \$400,000, was completed on this road about the same time he received his pay for building the wall, 12 years ago. He concluded to give a banquet, which he facetiously calls the Sea Wall Final, to the engineers who have been assisting him, in honor of the successful termination of his contract on the West Penn."

Mexican Notes.

The *Financier* reports that the Mexican Central Railroad has arranged a special time-table for trains carrying Mexican fruits to this country, and will put oranges, etc., in Denver, Omaha, St. Louis, St. Paul and Chicago at rates which will enable Mexican fruit growers to compete with those of California.

The telegraph lines in and to Mexico are all proving profitable, the Mexican Central's line paying expenses from commercial business alone, and the cable company keeps its shares above par. The service on the government lines is being continually improved and the lines extended.

The Custom House receipts at Vera Cruz for the past 10 years have been as under:

Fiscal years.	Duties on imports.	Total receipts.
1877-78	\$7,020,427	\$7,693,985
1878-79	5,403,504	6,782,272
1879-80	7,011,322	8,206,897
1880-81	7,846,198	8,075,513
1881-82	10,574,051	11,248,954
1882-83	11,035,694	12,541,078
1883-84	10,273,347	12,116,299
1884-85	8,800,830	10,027,428
1885-86	8,656,383	10,651,518
1886-87	10,510,836	10,923,750

The "assay and coinage dues," a duty on the export of silver, which yielded over \$20,000 in the fiscal year 1880 and 1881, yielded but \$135 last year, in consequence of the nearly total removal. The receipts from import duties have responded as was hoped from the reduction in the tariff. Though the frontier custom houses are doing a constantly increasing business, the trade of Vera Cruz is not falling off.

Subsidy to the Red Star Line.

The Belgian Government has continued to this line a subsidy of 250,000 francs for another year. The subsidy was strongly opposed in the legislative body.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings of the stockholders of railroad companies will be held as follows:

Eastern Illinois & Indiana State Line, special meeting, at the office, Chicago, Ill., Oct. 31.
Louisville & Nashville, annual meeting, at the office, Louisville, Ky., Oct. 15.
Momence & State Line, special meeting, at the office, Chicago, Ill., Oct. 31.
Ohio & Mississippi, annual meeting, at the office, Cincinnati, O., Oct. 13.
Carthage & Adirondack, at the office, 12 Broadway, New York, Oct. 17.
Evansville & Terre Haute, annual meeting, at the office, Evansville, Ind., Oct. 17.
Cincinnati, Indianapolis, St. Louis & Chicago, annual meeting, at the office, Indianapolis, Ind., Oct. 25.
Seattle, Lake Shore & Eastern, annual meeting, at the office, Seattle, Wash. Ter., Oct. 20.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

General Time Convention, Hotel Brunswick, New York City, Oct. 12. The report of the Committee on Uniform Train Rules, embodying the Code of Uniform Telegraphic Orders, will come up for final consideration. Also, a report from the Committee on Uniform Car Mileage.

The *New England Railway Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

North American Railroad Superintendents, at the Hotel Brunswick, New York, beginning Oct. 10.

The *Brotherhood of Railway Brakemen*, National convention, at Binghamton, N. Y., beginning Oct. 19.

The *Brotherhood of Locomotive Engineers*, annual meeting, Central Music Hall, Chicago, Oct. 19.

The *Association of Railway Section Foremen*, annual meeting, Council Bluffs, Ia., Oct. 5.

The *Roadmasters' Association of America*, fifth annual Convention, Kennard House, Cleveland, O., Oct. 11.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Delaware, Lackawanna & Western, $1\frac{1}{4}$ per cent., payable Oct. 20.
Long Island, 1 per cent., payable Nov. 1.
New York Central & Hudson River, quarterly, payable Oct. 15.

Conductors' Anniversary.

The anniversary of New Haven (Conn.) division 201, of the order of Railway Conductors, was celebrated on the evening of Oct. 2 in the New Haven Opera House. There was a large and enthusiastic audience of conductors, railroad officials and

citizens present. On the stage were seated about 200 conductors, including members of the order from New York, Boston, Philadelphia, Chicago, Baltimore, Hartford, Portland, Me., and from Missouri and Iowa.

In the boxes were Mayor York, President Charles P. Clark, Vice-President E. M. Reed, General Superintendent O. M. Shepard of the New York, New Haven & Hartford, President Stevenson of the New Haven & Derby, and John H. Leeds. Side by side with Chief Conductor H. S. Beers sat C. S. Wheaton, of Cedar Rapids, Ia., grand chief conductor of the order, and not far from them the order's poet, E. H. Belknap of Illinois.

After two selections had been rendered by Thomas' orchestra, Chairman Pardee introduced Calvin S. Wheaton of Cedar Rapids, Ia., grand chief of the order.

Round after round of applause greeted Grand Chief Conductor Wheaton, and it was several moments before he could be heard. He reviewed the formation of the order, nearly 20 years ago, told his hearers of the slow progress it made until a few years past, when it rapidly grew until now there are more than 13,000 members, and divisions have been formed in nearly every state and territory in the Union. There were many other speeches made, all of which were received enthusiastically by the crowd present.

New England Road-Masters' Association.

Notice is given of the fifth annual meeting of this association, to be held at the United States Hotel, Hartford, Conn., on Oct. 19 and 20. The notice says:

After the regular annual business of the Association, viz: Reading of the Minutes of last meeting, Enrollment of New Members, Reading Communications, Election of Officers, Report of Committees, Unfinished and Miscellaneous Business, there will be discussed the following questions:

"Economy of Labor and Material in Maintenance of Track."—The proper length of a section; number of men to the section, method of systematizing the labor and material used and what work should be done at different seasons of the year.

"Guard Rails at Frogs and Switches."—Length and correct form of the same; the flangeway and gauge for same; manner of fastening to prevent spread or turning over.

"Guard Rails at Bridges, with Bridge Floor."—Give facts of their benefit, where derailed trucks have passed over same in safety.

"Foot Guards at Frogs, Switches and Guard Rails."—The practical benefit of same; form and cost of maintaining same.

"Questions and Resolutions laid over from last annual meeting."

Review of previous year's discussions: Frogs, Switches, Joints, Rail Sections, Road Tools, Ballast, Nut Locks, Elevation of Curves.

There have been committees appointed on each question, who will report on same as each question is open for discussion.

P. A. EATON,	Executive Committee.
L. H. PERKINS,	
G. W. BISHOP,	
A. C. STEVENS,	
W. F. ELLIS,	

American Society of Civil Engineers.

At the regular meeting, Oct. 5, the following Members were elected: Henry St. Leger Coppée, Henry Clay Derrick, Joseph Norton Greene, Edward Buckingham Guthrie, Charles Edward Hewitt, Wynkoop Kiersted, James Imbrie Miller, Palmer Chamberlaine Ricketts, Granville Wheaton Shaw, Gratz Mordecai was elected Associate.

PERSONAL.

—George D. Brooke has resigned the position of Master Mechanic of the Chicago & Atlantic.

—O. M. Burnham, a civil engineer, committed suicide, by hanging, in Minneapolis, Minn., Sept. 30.

—C. D. Wall has resigned the position of Master Car-builder at the Montgomery shops of the Western Railway of Alabama.

—John E. Taft, a conductor on the Providence & Worcester road from the date of its opening in 1847 to 1881, died at Worcester, Mass., on Oct. 3.

—Frank F. Hemenway has been promoted to the position of editor and mechanical engineer of the *American Machinist*, with J. G. A. Meyer and Fred J. Miller as associates.

—W. E. Chamberlain, formerly General Superintendent, of the Providence & Worcester, is now in charge of the construction of the South Atlantic & Ohio, at Bristol, Tenn.

—Mr. John Bogart, Secretary of the American Society of Civil Engineers, was nominated by acclamation by the Democratic Convention at Saratoga last week for the office of State Engineer. Mr. Bogart, however, declined the nomination.

—Charles Dunlap, who recently resigned the Superintendency of the Western Division of the Baltimore & Ohio to accept a position with the Chicago, Rock Island & Pacific, has been made aware of the esteem in which he is held by his old associates and employees. They expressed it last week by presenting him with a gold watch and chain and a solid silver water service.

—Nathan Guilford, who has been appointed General Traffic Manager of the New York Central & Hudson River road, has been Assistant Commissioner of the Trunk Line Commission since 1882. He was formerly General Freight Agent of the Baltimore & Ohio and for some time was Vice-President and General Manager of the Manhattan Railway Co., and Commissioner of the Chicago pool.

—The Hon. George W. Allen died at Cleveland, O., on Oct. 5, aged 85 years. He was president of the village of Cleveland from 1831 to 1835, then he served two years in the state Senate, and was member of Congress from 1837 to 1840, was elected Mayor of the city in 1841 and was the first president of the Cleveland, Columbus & Cincinnati Railroad, being chosen to that position in 1846.

—Ex-Governor Alexander H. Holley, of Connecticut, whose serious illness we chronicled a few weeks ago, died at the age of 83, at his home in Lakeville, Conn., Oct. 2.

He was greatly beloved, and was held in high esteem by all who knew him. To the younger readers his name will at once suggest his distinguished son, Alexander Lyman Holley, past President of the American Society of Civil Engineers, whose splendid contributions to scientific literature and art are known throughout the civilized world. But the public services and private character of the Elder Holley give him a place of his own in our history.

Ex-Gov. Holley was one of the promoters of the Connecticut Western Railroad, and since its organization and its reorganization into the Hartford & Connecticut Western has constantly been an active member of its Board of Directors. He was also one of the original promoters of the Housatonic and the New York & Harlem, and intimately connected with their original construction and early management. He was the founder of the Holley Manufacturing Co., of Lakeville. His father, John Milton Holley,

was of the firm of Holley & Coffin, who cast the first iron cannon made in this country.

Ex-Gov. Holley was elected Lieutenant Governor of the state of Connecticut for the years of 1854-55, and also its Governor for the years of 1857-58. In the political field he has been an active and prominent Republican ever since the birth of that party, and was always recognized as a man of marked ability and uprightness of character.

ELECTIONS AND APPOINTMENTS.

Chicago, Burlington & Quincy.—C. G. Wilson has been appointed Assistant General Freight Agent, with headquarters at Chicago.

E. J. Swords has been appointed General Eastern Agent, with headquarters at 317 Broadway, New York, vice R. Tenbroeck, resigned.

Chicago & Eastern Illinois.—D. R. Patterson has been appointed Assistant General Manager, Robert Spencer is appointed Purchasing Agent, and P. W. Drew Superintendent of Transportation in addition to his duties as Superintendent of Telegraph.

Chicago, Rock Island & Pacific.—F. E. Hayne has been appointed Cashier vice J. F. Phillips, promoted to Assistant Secretary and Treasurer. G. T. Beggs has been appointed Paymaster. Samuel Higgins has been appointed Assistant Traveling Auditor.

Colorado Southern.—The incorporators of this Colorado company are Charles H. Marr and Henry L. Short, Florence, Col.; Charles H. Blake, Greenwood; Albert S. Blake, Florence and Charles D. Bradley, Canon City.

Illinois Central.—E. H. Harriman, of New York, has been elected Vice-President, and will make his headquarters at Chicago.

Kanawha & Ohio.—M. Sweeney has been appointed Superintendent.

Lakeside & Marblehead.—The following directors of this Ohio road were elected last week: H. A. Blood, of Boston, Mass.; George N. Smalley, William Rotch, W. O. Chapman, E. J. Blardin, A. S. Emery, J. W. Wardwell, H. A. Kennedy and Albert Rokusek. The officers are: H. A. Blood, President; W. O. Chapman, Treasurer; E. D. Hewins, Transfer Agent and Secretary; J. W. Wardwell, Superintendent; Albert Rokusek, General Freight and Passenger Agent; W. M. Harsh, General Agent.

Little Rock & Memphis.—Rudolph Fink is President; directors, Geo. B. Rose, J. W. Winne, H. P. Talmage and Simon Boy.

Louisville & Nashville.—At the meeting this week the board and officers were re-elected.

Louisville, New Orleans & Texas.—At the meeting in Memphis, Tenn., this week the old board and officers were re-elected.

Meacian National.—George Bernard has been appointed Purchasing Agent, with office at 32 Nassau street, New York.

Minneapolis & St. Croix River.—J. M. Robinson, President; C. A. Pittsburg, Vice-President; M. P. Hawkins, Secretary; Charles K. Sidle, Treasurer.

Newton & Wichita Rapid Transit.—The directors of this new Kansas company are: A. P. Smith, S. D. Williams, B. C. Parnellee, J. R. Dressor, of Newton; E. J. Turner, of Sedgwick.

New York Central & Hudson River.—Nathan Guilford has been appointed General Traffic Manager.

New York, Chicago & St. Louis.—W. K. Vanderbilt has been elected chairman of the board of directors, D. W. Caldwell President, Allyn Cox Secretary and Treasurer.

New York, Lake Erie & Western.—It is reported that W. C. Rineason, the present General Northern Passenger Agent, is to be made Assistant General Passenger Agent.

Pacific Mail Steamship Co.—George J. Gould has been elected President. Jay Gould has been chosen director in place of Mr. Mehrbach and C. P. Huntington in place of Mr. Vanderhoef.

Peoria, Decatur & Evansville.—Frank C. Smith has been appointed Master Mechanic, vice P. Reilly, resigned.

St. Augustine & East Coast.—The incorporators of this Florida company are: S. J. Fox, S. Fleming, F. F. Oliveros, Geo. W. Gibbs, and Ramon Hernandez.

St. John & Northeastern.—At a meeting held in St. Martin's, N. B., to reorganize this company under renewal and extension of charter, the following officers and directors were elected: A. E. Kilrain, President; W. H. Rourke, Louis De Bertram, R. O. Stockton, Chas. D. Jones; W. E. Skillen, Secretary and Treasurer.

Salt Lake & Los Angeles.—The incorporators and directors of this Utah company are: Caleb W. West, W. S. McCormick, J. G. Sutherland, H. R. Houghton, James Jack, G. D. Shell, Isaac Trumbo, James Stokes, Wm. Hitchcock, J. N. L. Hunt.

San Antonio & Aransas Pass.—A. G. Cooper is appointed Auditor of this company in charge of traffic and operating accounts.

Union Pacific.—T. W. Young has been appointed Traveling Passenger Agent of this company in charge of District No. 12, with headquarters at 57 Clark street, Chicago, vice J. F. Wiley, transferred.

J. F. Coykendall has been appointed private Secretary to Vice-President Potter. D. W. Hitchcock has been appointed General Agent, with office at San Francisco.

Western, of Alabama.—William Apps has been appointed Master Car-builder at the shops in Montgomery, Ala., vice C. D. Wall, resigned.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—That portion of the Kansas Southern road, west of Wellington, is now operated as a part of this system, whose officers will have charge over it.

The company has purchased the Chicago, Rock Island & Pacific's right of way from St. Joseph to Carrollton, Mo., and will probably construct a line between those points.

The company is now building its line from Santa Ana, Cal., to Anaheim alongside the southern Pacific.

The track was completed last week between Pueblo and Denver, Col.

Atlanta & Florida.—This is the new name of the Atlanta & Hawkinsville.

Baltimore & Ohio.—It is reported that the railroad company has abandoned the telegraph system and has given

formal notice to the officers of the telegraph company that no more ad snail be forthcoming.

The company has put all men in the car shops on a 10-hour schedule. They had been working 8 hours a day since June.

Bloomsburg & Sullivan.—This road, which is an individual enterprise, has been put in operation between Bloomsburg and Benton, Pa. It is calculated to finally extend it into the bituminous coal regions of Sullivan County, connecting with the State Lane road at Dushore.

Boston & Maine.—The Boston Herald states that the company will probably not take possession of the Boston & Lowell for several weeks yet. Engineers are at work trying to find the best way of rearranging the Boston & Lowell, the Boston & Maine, and the Fitchburg tracks for an entrance into the new union station. The directors have not yet decided on any plan for the station.

Buffalo, New York & Philadelphia.—An application was made in Pittsburgh last week for the discharge of the Receiver of this road, recently sold under foreclosure, the purchasers giving bonds for the Receiver's accounts and taking possession at once. If the application is granted it will hasten the reorganization and admit of its entire completion before December.

Burlington & Lamoille.—The stockholders have decided to issue \$500,000 preferred stock, interest at 6 per cent., to redeem first mortgage bonds, interest on which has been defaulted for several years.

Burlington & Missouri River.—The Rulo bridge is completed across the Missouri River, and this company's freight trains now run into St. Joseph, Mo.

Canadian Pacific.—Three thousand men have been employed on the snow sheds along this road since spring. Most of the sheds are in the Selkirk and Rocky Mountains.

Central Massachusetts.—Last week the rails were down to Belchertown, Mass., and within a few days the track will reach the Connecticut River, but owing to the fact that the builders of the bridge over the Connecticut are behind in their contract, the road cannot be opened into Northampton before Dec. 1.

Chenango & Cortland.—A company has been formed to complete the line from Cortland to Cincinnatus, N. Y., 12 miles.

Chicago, Burlington & Northern.—The Supreme Court has decided against this company in the matter of right of way between Galena, Ill., and Dubuque, Ia., depriving it of 12 miles of track built on Illinois Central right of way. The Chicago, Burlington & Northern has applied for a rehearing. It is said that if the decision should stand the company will build a new line off the Illinois Central's right of way.

Chicago, Burlington & Quincy.—It is rumored that this company will build the proposed line from Salt Lake to Los Angeles, receiving aid from a Western syndicate. This is nothing more than a rumor.

Chicago, Kansas & Nebraska.—There are 700 miles of road now in operation. The branch through Hutchinson to the south central part of Kansas has been completed for some time. Trains are running to Greensburg, Kiowa County. Tracklaying beyond this point is finished some distance beyond Mulhville in the same county. Grading is completed to the south line of Seward County. Track is laid on the branch from Harrington through Enterprise for 10 miles. It is expected this line will be completed to Salina, Kan., before winter sets in. On the line extending west from Belleville, in Republic County, track was laid to a crossing of the Missouri Pacific at Scandia, last week. From Fairbury, Neb., to Belleville this line is completed and in operation. Trains connect with Chicago, Rock Island & Pacific regular trains through Nebraska to St. Joseph, Mo. On the line starting from McFarland, in Wabasha County, Kan., and laid out through Manhattan, Clay Center, Clifton and Clyde to Belleville, track is down about 8 miles.

Chicago, Milwaukee & St. Paul.—Track is laid on the Kansas City extension to Mosby, 179 miles from Ottumwa and eastward from Kansas City, 33½ miles, leaving a gap of 20 miles to complete the line. The Missouri River Bridge is completed with the exception of tracklaying. Track is laid on the Merrill, Wis., extension for 34 miles north of that place and 5 miles north of the crossing of the Minneapolis, Sault Ste. Marie & Atlantic road.

The trains of this company will not run into St. Joseph, Mo. The company has a traffic agreement with the St. Joseph & St. Louis, by which the latter is to take charge of its passengers and freight destined to St. Joseph at Lawsons, and bring them to the former city. The St. Paul's trains will run solid between Kansas City and Chicago.

Chicago, Rock Island & Pacific.—The surveyors in the Indian Territory report having found an excellent route in the direction of Cisco, Tex. They are now between the South Canadian and Wichita rivers and will reach the Texas line in about six weeks.

Cincinnati, Hamilton & Dayton.—It is stated that a syndicate has been formed for the purchase of the securities of this company, and that the securities pledged by H. S. Ives & Co. for loans will be taken up as soon as it is decided that no receiver for the property will be appointed. The syndicate is composed of New York and Cincinnati capitalists who propose to retire the preferred stock, and expect by so doing to increase the value of the common stock to a figure which will give a profit on the money advanced.

The Piqua & Troy Branch from Piqua to Troy, O., was finished last week and regular trains are now running. Arguments in the case of the application for a receiver for this road were closed on Sept. 30 before Judge Vanderveer at Hamilton, O. The judge will announce his decision next week.

Cincinnati, Jackson & Mackinaw.—The company is surveying a route into Toledo, O. It now operates over the Toledo, Ann Arbor & North Michigan.

Cincinnati, New Orleans & Texas Pacific.—It is announced that the company has put on a train which reduces the time between Cincinnati and New Orleans eight hours, leaving Cincinnati at 7:55 a. m. and reaching New Orleans the next morning at 9:30. It is apparently an acceleration of the former schedule, not an additional train.

Cincinnati, Wheeling & New York.—Commissioner Capper, of Ohio, after receiving the report of the inspection of this 19-mile road in Guernsey County, O., which is in bad condition, has ordered the rate of speed of all trains reduced to 8 miles an hour.

Clarksburg, Weston & Glenville.—The company has bought land at Weston, W. Va., and will build thereon a round-house and machine shops. Additional rolling stock is to be purchased and air brakes applied to all trains.

Cleveland & Canton.—It is reported that one of the improvements to be made in conjunction with the change of the road to standard gauge is the construction of a double

track from the Cleveland terminus to Newburgh, O., or further, for the development of suburban traffic.

Cleveland & Mahoning Valley.—The directors have authorized the issue of \$2,500,000 bonds to take up the old mortgage and provide \$1,000,000 to double track the road from Cleveland and Youngstown, O.

Colorado Southern.—Incorporated in Colorado to build a road from Pueblo to Del Norte. Headquarters at Florence, Col.

Denver & Golden.—A company has been organized in Denver, Col., to build a road to Golden, 14 miles. I. B. Porter, of Denver, can give information.

Denver, Memphis & Atlantic.—This road, which is part of the Missouri Pacific system, will be finished by Dec. 1, and a through car service will then be put on from Denver to St. Louis, via Kansas City.

Denver & Rio Grande.—The company has ordered 1,000 new freight cars. A large number of passenger coaches and 30 locomotives are also being built. The new rolling stock will be used for the equipment of new extensions in Colorado and New Mexico.

Des Moines & Northwestern.—It is stated that this road from Waukegan to Fond du Lac, 114 miles, which has recently been operated by the Wabash Western, has again passed to the control of its original owners, Messrs. Dodge and Polk.

Dubuque & Sioux City.—The lease of this road to the Illinois Central having expired W. J. Knight, of Dubuque, has, as President of the Dubuque & Sioux City been put in possession of that property, including the Cedar Falls & Minnesota. These roads, aggregating 217 miles in length will now be operated as an independent line.

The 20 years' lease of this road to the Illinois Central expired last week, and a formal transfer of the road was made to the original company. The line runs from Dubuque to Iowa Falls.

Duluth, Haron & Denver.—The survey from Sauk Centre, Minn., to Duluth, is very nearly finished. The only remaining contract, that west of Appleton, was let last week to Anderson & Nelson. The bridge crew is making rapid progress and will reach Grove Lake this week. There are several bridges of considerable length to be built, one 1,100 ft. long, and three or four ranging from 300 to 700 ft. Tracklaying will commence before the middle of October, and it is believed it can be completed to the state line within thirty days from the beginning of the work.

East Tennessee, Virginia & Georgia.—This road is to discontinue the use of a pay car, paying its men hereafter through the station agents.

It is understood the company will bid for the Rome & Decatur road, which is to be sold by order of the Court.

Elizabethtown & Hodgenville.—Grading is in progress on this road in Kentucky, which is 11 miles long. J. W. Robinette, of Elizabethtown, Ky., is Chief Engineer.

Eufaula & East Alabama.—The contract for building the road from Clayton to Ozark, Ala., has been awarded to Wright & Strothers, Birmingham, Ala.

Fort Worth & Denver City.—Through trains were put on last week from Fort Worth to Clearendon, Tex., 277½ miles. Track is laid 352 miles from Fort Worth.

Fort Worth & Rio Grande.—The engineers are locating the line to San Angelo, Tex., 205 miles southwest of Fort Worth and 165 miles from Grandbury, the present terminus. Fifty miles of rails for this extension have been purchased. It is said that the contract for 30 miles of grading has been let. It is proposed to have the entire 205 miles in operation by next July.

Garden City Nickel Plate.—Grading began on this road last week at Garden City, Kan. The line is expected to be finished by next June.

Georgia.—The bills introduced in the Legislature to incorporate the Brunswick & Atlantic; the Atlantic, Atlanta & Great Western, and the Dupont, Macon & Florida, and to change the name of the Griffin, La Grange & Western to the Birmingham & Atlanta Air Line Railroad, Banking & Navigation Co., have become laws. Bills have been introduced to incorporate the Newton, Morgan & Lumpkin Railroad Co.; the Albany & Bainbridge Railway Co., authorized capital stock \$2,000,000, with B. B. Bower, J. D. Harrell, W. E. Smith and others as incorporators; the Tallulah Falls Railroad & Improvement Co., and the Hephzibah & Hawkinsville Railroad Co.

Georgia Southern & Florida.—Hampton & Braiden, of Madison, Ga., have contracted to build part of this road.

Grand Trunk.—This company is credited with the intention of building to the Sault to connect with the American system over the new bridge.

Guelph Junction.—The contract for building the road from Guelph to Campbellville, Ont., on the Canadian Pacific, has been awarded to Ryan, Cosgrove & Booth.

Gulf & Ship Island.—The company has filed a mortgage for \$7,000,000 to secure the first issue of bonds for the completion of the road, which is now under course of construction from 2½ miles west of Mississippi City to a junction with the Memphis & Charleston just beyond the Mississippi line. The total length of the road will be about 350 miles, of which 60 miles from Middleton, Tenn., to Pontotoc, Miss., is completed, and about 77 miles to connect with the New Orleans & Northeastern at Hattiesburg is expected to be finished by next January.

Hawkinsville & Dublin.—The company has been organized at Hawkinsville, Ga., for the purpose of building a road from Hawkinsville to Dublin and from Hawkinsville to Perry. A. E. Laidler, Hawkinsville, can give information.

Housatonic.—At a special meeting of stockholders in Bridgeport, Conn., this week, it was voted to increase the capital stock of the company from \$2,000,000 to \$3,000,000, to purchase new rolling stock, build extensions and to issue consolidated mortgage bonds. There is about \$3,770,000 due for unearned but cumulative dividends covering the last 30 years. By the terms of the new agreement each share of 8 per cent. preferred cumulative stock will be exchanged for one share of new 4 per cent. non-cumulative stock, and also either one additional new share or a new \$100 bond will be issued to cover the back dividends. The common stockholders will be entitled to exchange three shares of existing common stock for one new 4 per cent. non-cumulative stock. The privilege of the settlement will be kept open for 90 days.

Indianapolis, Decatur & Springfield.—There was a report circulated recently that this company had purchased the Clayton Division of the Wabash and leased the Keokuk & Western road, and that a through line to Omaha would be formed. President Hughes, of the Keokuk & Western, denies the report.

Inter-state Rapid Transit.—The company has obtained a franchise to extend its road from Kansas City to Armourdale. A viaduct to cost \$30,000 will be built across the Union Pacific tracks at Armstrong.

Kansas City & Pacific.—The road has been extended north from Grant Centre, Kan., to Moran, 16 miles.

Kansas City, Wyandotte & Northwestern.—Tracklaying is completed from Wyandotte to Valley Falls, Kan., 60 miles.

Lake Shore & Michigan Southern.—The company began the operation of its branch from Doughton, O., to Sharon, Pa., 5 miles, last week. Construction has not yet commenced on the extension to Sharpsville, Pa.

Little Rock & Memphis.—The company, as reorganized, has filed articles of incorporation in Arkansas.

Louisville & Nashville.—The President's report read at the meeting in Louisville this week shows that the year to June 30 was the most prosperous in the history of the road. Operating expenses were 60 per cent. of the gross earnings. The net income was \$1,832,252. The floating debt of \$2,149,020 on June 30, 1886, was reduced to \$110,188, though the increase in the bonded debt was only \$644,342. The expenditure for improvements on the present lines was \$767,617; for the construction of new lines to be completed by Jan. 1, 1888, \$1,328,962. To cover the expenditure on new lines, first mortgage 5 per cent. 50-year gold bonds at the rate of \$15,000 to the mile, constituting a first lien on the new property, were sold to the amount of \$1,350,000. The new lines are Cumberland Valley, Corbin, Ky., to Pineville, Ky., 30 miles; Bardstown Extension, Bardstown, Ky., to Springfield, Ky., 14 miles; and Nashville & Florence Extension, St. Joseph, Tenn., to Florence and Sheffield, Ala., 56 miles. It is proposed to build 54 miles extension to the Birmingham Mineral Road, encircling Red Mountain, through Bessemer, Ala., and Woodward to Boyle Station, thus making a large belt road about Birmingham. This extension will include a branch into the great coal field about Edwards furnace, near Woodstock, Ala. Twenty-six miles are also being constructed completing the road from Clarksville, Tenn., to Princeton, Ky. The expense for these extensions is given as a reason for not declaring a dividend. If the earnings continue satisfactory the directors hope to declare a dividend this year.

Louisville, St. Louis & Texas.—Tracklaying was begun at Owensboro, Ky., on Sept. 30. The road will be completed to the Chesapeake & Ohio at West Point, Ky., by Jan. 1, 1888.

Louisville Southern.—Work on this road is being pushed vigorously, and an effort will be made to complete it from Louisville to Harrodsburg Junction, Ky., on the Cincinnati Southern, 75 miles, by next February.

Louisville, Waynesboro & Alexander.—This company has been incorporated in Georgia.

Manhattan.—On two days last week the New York elevated roads carried over 540,000 passengers a day.

Memphis, Arkansas & Kansas.—Work will commence on this road about Dec. 1.

Mexican Central.—The company has recently contracted for 200 box cars and 12 locomotives. Beginning about Oct. 10, the cars will be delivered at the rate of 10 a day. The local traffic of the road is constantly increasing.

New Roads.—A special dispatch to the Boston Herald from the City of Mexico says that Robert R. Symon has, at the request of the government, made over his concession for a railway in the states of Sinaloa and Sonora to a company composed mainly of Philadelphia capitalists, who will build a coast line running up from the seaport of Mazatlan to Culiacan, the capital of the state of Sinaloa, and thence on through fine hardwood forests and rich mineral and coal lands to Posquerra, on the line of the Sonora railway, thus making connection with the American border. Governors Canedo and Torres of the states of Sinaloa and Sonora, respectively, are behind this undertaking.

It is reported that E. H. Brennan, late President of the Lakeside & Marblehead, is about to build a road from Port Clinton to Fremont or Bowling Green, O.

Newton & Wichita Rapid Transit.—Incorporated in Kansas to build a line between the two cities. Capital, \$200,000.

New York Central & Hudson River.—When the company paid the state tax of \$57,225 this week, it filed a protest claiming that the tax on all its inter-state business was illegal and in violation of the Constitution of the United States. The road claims that the only earnings on that part of its business beginning and ending in the state is subject to state tax.

New York, Chicago & St. Louis.—The reorganized company has filed its mortgage for \$20,000,000 in favor of the Central Trust Co., of New York.

New York District.—The Court of Appeals, at Albany, N. Y., by affirming the order of the General Term, has practically put an end to the scheme of this company to build a road under Broadway in New York. The company was formed in 1885. In 1886 it applied to the Supreme Court for the appointment of commissioners to determine how its road should be built and to obviate the necessity of securing the consent of property owners. The General Term decided against this, and the Court of Appeals now affirms the decision.

New York, New Haven & Hartford.—The Northampton Division of this road, which has for several years run trains from Conway Junction to North Adams Mass., over the Troy & Greenfield, under a contract made with the latter before its sale to the Fitchburg, will henceforth make its northern terminus at Shelburne Falls, thus using only four miles of the Fitchburg's track.

It is reported that the through freight business between New Haven and New York and Vermont and Canada will hereafter be transferred to and from the Connecticut River road at Greenfield instead of at Springfield, as at present. The New York, New Haven & Hartford would naturally desire this, as its haul would thus be lengthened some 35 miles, the Northampton division being parallel to the Connecticut River road for that distance.

The Auditor's and Treasurer's office were removed this week from New York to New Haven.

New York, Pennsylvania & Ohio.—With the completion of the track in the Akron, O., yard of this road, accomplished last week, the road has been relaid with 61½ pound rails from Salamanca, N. Y., to Dayton, O. The eastern end of the work was done some time ago; that from Dayton to Akron was begun last June.

New York, Providence & Boston.—The company has bought a piece of land in New London, Conn., and it is believed that the purchase indicates that the project of bridging the Thames River at that place, which was considered some years ago, will soon be carried into effect.

Northern Pacific.—The directors voted last week to join with the Union Pacific in a lease of the Oregon Railway & Navigation Co.'s property. The Union Pacific leased the Oregon line last spring with a guarantee of 6 per cent. dividends. The Northern Pacific had refused to join in the lease, because the rate was considered too high and the questions about territory were not settled.

Oakley, Colby & Northwestern.—This road was completed from Oakley to Colby, Kan., last week.

Oregon Railway & Navigation Co.—W. H. Kennedy, Chief Engineer, has made plans for two new lines, one from Wallula north for about 12 miles to Snake River, thence to Riparia; also a branch to a point on the other side of the river from Riparia northeastward to a junction with the Columbia & Palouse branch of the company. This line is partly graded. Another branch is laid out from Moscow about 10 miles east to the Potlatch River, thence down the Potlatch to Clearwater. It is stated that the company is waiting for the decision of the Inter-state Commission on complaints brought by several residents of Washington Territory, claiming that excessive freight charges have been made, before constructing these new lines. The transportation of grain will be the principal source of revenue of the branches, and if the Commission cuts freight rates to an unprofitable extent work will not be begun, and a decision favorable to the company means the construction of the lines.

Ottawa & Gatineau Valley.—The line is under survey from Ottawa, Ont., to Desert Village, 100 miles. From Ottawa to La Peche, 20 miles, it is located and construction work is to begin immediately. H. J. Beemer, of Montreal, is President; W. D. Harris, 14 Metcalf street, Ottawa, Chief Engineer.

Pacific.—The Pacific Railway Commission continued taking testimony in New York this week. Collis P. Huntington was examined and on Oct. 3 the testimony of John I. Blair was begun and continued on Oct. 4. It was in reference to the cost of constructing the Sioux City & Pacific road.

Pennsylvania.—Work is progressing on the Radebaugh Branch, 3 miles in length. The company has also nearly finished the new low-grade line at Leechburg, on the Western Pennsylvania Division, thereby making the ruling grade of the division 21 ft. per mile.

Pennsylvania, Poughkeepsie & Boston.—This company, previously reported, obtained its charter in Pennsylvania this week. Capital stock, \$1,250,000.

Pensacola & Memphis.—The three companies of this name in the states of Alabama, Florida and Mississippi have consolidated.

Philadelphia & Reading.—The report of the masters appointed to take testimony in the foreclosure proceedings of this company will, it is stated, be ready for submission to the United States Court by Oct. 10. If the reorganization trustees and the holders of consolidated 5s are unable to come to an understanding by that time a decree of sale will be obtained.

Pomona & Elsinore.—It is officially stated that the road between these two towns in California will be built. The survey has been made and grading will commence immediately. The road is to be finished by next January, and then, it is said, it will be extended to Los Angeles.

Portland & Willamette Valley.—This road will be extended from its present terminus at Dundee, Ore., to a point on the Willamette River opposite Ray's Landing.

Red River Valley.—A dispatch of Oct. 3 says that Hugh Ryan, the contractor for the building of this Manitoba road, has ordered all the sub-contractors to stop work and has thrown up his contract. This is the immediate result of the failure of Premier Norquay to negotiate his loan. The hope is still entertained that the Northern Pacific will come to the rescue if no other way is found. In the present uncertainty as to the outcome of the injunction suits there would seem little chance of a loan being placed.

Premier Norquay, of Manitoba, says in regard to his failure to float the Red River Valley bonds: "There were three causes. The first was the stringency of the money market. The second was the malign influence exerted by the Canadian Federal Government and the Canadian Pacific Railway Co., who actually had their agents dogging my every footstep and prejudicing the minds of the money lenders against investing in the railway. The third cause was the outrageous reports sent to American newspapers by Canadian correspondents describing the state of the people of Manitoba to be that of rebellion. The Manitobans are law-abiding and peaceable, and we are building our railway quietly, but these newspaper reports were alarming to the money lenders."

The Premier says that the road will be built in spite of opposition. He says Manitoba will raise more than half the required capital, and he expects aid from the Northern Pacific.

Rome, Watertown & Ogdensburg.—The new bridge over the Genesee River in Rochester, N. Y., was opened by President Charles Parsons on Oct. 3. The bridge is 800 ft. long and 100 ft. above the water. It admits the road to the heart of the city.

The company will build a freight house 200 by 40 ft. at Rochester, N. Y.

Rumford Falls & Buckfield.—The survey of the extension from Gilbertville to Rumford Falls, Me., 14½ miles, is completed.

Sabine & Northern.—Incorporated at Longview, Tex., to build a road from that place to connect with the Galveston, Sabine & St. Louis, and to be run in conjunction with the latter road.

St. Augustine & East Coast.—This company has been incorporated in Florida to build a road from St. Augustine to Daytona, and it is said that work will begin at once.

St. Louis, Iron Mountain & Southern.—Suits aggregating \$150,000 have been instituted against the company at Little Rock, Ark. They are for damages sustained by plaintiffs on July 4, 1887, when they were side-tracked in a passenger car at Newport, Ark., and unreasonably detained. The accounts state that the grounds for these claims are somewhat unusual: which is doubtless true, so far as their presentation in court is concerned; but the people who have been "side-tracked in a passenger car" are not by any means unusual. Generally, however, they lack the brass to come into court and swear that their time that has been wasted was worth anything.

St. Paul, Minneapolis & Manitoba.—During the past year there have been added to this company's rolling stock 15 locomotives and 1,275 cars, and contracts for 25 locomotives, 25 passenger cars and 1,119 freight cars are yet uncompleted. The cost for the new equipment for the year is \$1,400,000. Improvements in the roadbed will soon reduce the maximum of grades for the entire system to 31½ ft. to the mile.

Salt Lake & Los Angeles.—The company has been incorporated in Utah to build a road from Salt Lake City to

a point on the western boundary of Utah, a distance of 175 miles.

Seattle & West Coast.—Work on this road continues without interruption. From Snohomish City, W. T., the work of grading is completed for 7 miles and tracklaying has begun.

Selma & Cahaba Valley.—It is stated that the building of this road from Selma, Ala., to the Cahaba coal fields is now a certainty.

Selma, Marion & Memphis.—In Vicksburg, Miss., this week 150,000 acres of land were sold to satisfy a judgment of nearly \$750,000 in favor of William H. Timpson, trustee of the estate of Henry Clews, of New York, against this company; the trustee bid in the land as the nominal price of \$12,000. The road was projected soon after the war by the late Gen. N. B. Forrest.

Sheffield & Birmingham Coal, Iron & Railroad.—The company contemplates building a branch in Franklin County, Ala.

Shenandoah Valley.—The company is relaying the road with steel rails, and 16 small wooden bridges will be replaced by iron ones during the next few months.

Southern Pacific.—The company has begun a new survey to Clear Lake from its Californian Pacific line, beginning at Rutherford in Napa County, Cal. It parallels the new McNulta line for over 20 miles.

The company has received, or has now on the way, 55,000 tons of rails manufactured in England for the extensive developments of the system in California.

Terre Haute & Indianapolis.—The argument of the demurrer in the suit of the St. Louis, Vandalia & Terre Haute has been postponed until Oct. 18.

Texarkana & Fort Smith.—The engineers are now making the permanent survey between Texarkana and Fort Smith, Ark.

Texas & Pacific.—The work of raising the track and substituting steel for iron rails on the New Orleans division of this road progresses rapidly. A year ago there were no steel rails on this division, now 230 miles are laid with steel, and the remaining 148 miles will be laid with the same material by the end of October. Over 200 miles of steel have also been laid on the Rio Grande division, which division was also wholly of iron a year ago.

Texas, Sabine Valley & Northwestern.—A new company has been formed in which is merged the Galveston, Sabine & St. Louis. The company will build from Galveston, Tex., south to Sabine Lake and northwest to Paris.

Toledo, Saginaw & Muskegon.—Tracklaying progresses at the rate of 1½ miles a day. It is now expected that trains will be running through from Toledo to Muskegon by Dec. 1. The road will be an important one to Toledo. It opens up new lumber facilities in Muskegon.

Union Pacific.—Surveyors in the employ of this company are reported to have begun work at Market Lake, Idaho, to locate a line to the National Park.

Washington, Ohio & Western.—The Court of Appeals at Staunton, Va., has given a decision in the case of this company against Cazenave and the County of Clark. By the decree Clark County is held liable for its \$100,000 subscription to the capital stock of the Alexandria, London & Hampshire road, the predecessor of the Washington, Ohio & Western, but the railroad company under its contract must indemnify the county. The sale of the road is decreed. The road runs from Alexandria to Round Hill, Va., 50 miles.

Western New York & Pennsylvania.—This is now the name of the Buffalo, New York & Philadelphia.

TRAFFIC AND EARNINGS.

Reduced Rates for Employes' Families.

One thousand mile tickets for the use of the families of employes, and sold for \$10, have been issued by the New York, Lake Erie & Western.

Texas Traffic Association.

This association has been reorganized and now takes cognizance of rates to and from Mississippi and Missouri River points to and including St. Louis and Kansas City.

Live Stock Deliveries at Chicago.

The following shows the number of cars of stock delivered at the Chicago Union Stock Yards during the month of September for the years named:

Roads.	1887.	1886.	1885.	1884.
Baltimore & Ohio.....	19	29	49	41
Chicago & Alton.....	2,048	1,954	1,819	1,515
Chicago & Atlantic.....	10	69	92	87
Chicago, B. & Q.....	4,393	4,942	4,458	3,145
Chicago & East. Ill.....	403	255	174	123
Chicago & Grand Trunk.....	37	38	30	47
Chicago, Milwaukee & St. P.....	1,769	1,863	1,687	1,857
Chicago & Northwestern.....	3,256	3,581	2,883	2,011
Chicago, Rock I. & Pac.....	1,813	1,640	1,857	1,795
Chicago, St. Louis & Pitts.....	27	42	28	20
Chicago, St. Louis & St. Fe.....	23	23	23	23
Illinois Central.....	1,265	1,298	789	667
Lake Shore & M. S.....	63	165	151	125
Louisville, N. & C.....	84	120	85	75
Michigan Central.....	114	185	106	101
New York, C. & St. L.....	15	30	15	17
Wabash, St. Louis & Pac.....	1,574	1,245	997	1,217
Min. & Northwestern.....	283	.....	.....	.....
Wisconsin Central.....	181	204	.....	.....
Pittsburgh & Ft. Wayne.....	15	28	31	33
Total.....	17,582	17,715	15,251	12,886

Coal.

The coal tonnages for the week ending Oct. 1, are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Anthracite.....	684,795	670,111	I. 14,684	2.1
Bituminous.....	277,866	271,005	I. 6,861	2.5

The coal tonnages of the Pennsylvania road for the week ending Sept. 24 are reported as follows:

Line of road.	Coal.	Coke.	Total.
To Sept. 24, 1887.....	156,651	87,328	243,979
To Sept. 24, 1886.....	7,429,914	2,514,415	9,944,359
To Sept. 24, 1886.....	6,118,130	2,518,890	8,637,020

Cotton.

The cotton movement for the week ending Sept. 30 is reported as below, in bales:

Interior markets:	1887.	1886.	Inc. or Dec.	P. c.
Receipts.....	147,880	99,329	I. 48,557	48.8
Shipments.....	111,479	85,409	I. 26,070	30.5
Stock.....	118,961	72,654	I. 46,307	63.6
Exports:	238,745	176,495	I. 62,250	35.3
Receipts.....	131,445	68,000	I. 63,445	93.2
Stock.....	377,689	330,033	I. 47,656	14.4

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of September:	1887.	1886.	Inc. or Dec.	P. c.
Buff., N. Y. & P.....	\$257,200	\$238,200	I. \$19,000	8.0
Cairo, V. & Chic.....	61,084	58,525	I. 2,559	11.2
Canadian Pac.....	1,046,000	963,000	I. 83,000	8.6
Chi. & Alton.....	207,469	184,315	I. 23,154	12.5
Chi. & East. Ill.....	182,454	162,390	I. 20,064	12.3
Chi. & Ind. Coal.....	42,835	22,542	I. 20,293	91.8
Chi. M. & St. P.....	2,359,000	2,551,971	D. 192,971	7.6
Col. H. V. & Tol.....	261,688	242,201	I. 19,487	8.0
Ft. W. & Den. C.....	42,259	16,230	I. 26,029	38.3
Louis., N. A. & C.....	214,346	190,592	I. 23,754	12.4
Long Island.....	359,995	330,286	I. 29,709	9.0
Louisv. & Nashv.....	1,441,271	1,258,191	I. 183,080	14.5
Mexican Cen.....	363,910	296,609	I. 67,301	22.6
Mil. & N. O.....	332,123	242,531	I. 89,592	36.9
Mil. & North.....	94,839	59,237	I. 35,602	60.1
Mobile & Ohio.....	230,714	174,356	I. 56,358	32.3
Norfolk & West.....	377,234	306,966	I. 70,268	23.3
Northern Pac.....	1,351,201	1,372,673	D. 21,472	1.5
St. L., A. & T.....	281,984	164,907	I. 117,077	70.9
St. Louis & S. F.....	574,000	488,500	I. 85,500	17.5
Tol., A. & N. M.....	53,914	35,046	I. 18,868	51.3
Tol. & Ohio C.....	105,730	75,826	I. 29,904	39.4
Wabash Ry.....	658,000	507,000	I. 151,000	23.4
Wheeling & L. E.....	64,279	53,278	I. 11,001	20.6
Total.....	\$10,950,930	\$10,017,167	I. \$933,763	9.3
Net.....	.....	.....	D. 216,443	2.3
Net.....	.....	.....	I. 717,320	7.1

Month of August:	1887.	1886.	Inc. or Dec.	P. c.
Canadian Pac.....	\$1,055,170	\$922,133	I. \$133,037	14.4
Net.....	388,411	380,032	I. 8,379	1.6
Cl., C. & I.....	437,191	408,538	I. 28,653	6.9
Net.....	186,736	180,232	I. 6,504	3.5
Gr. Rapids & Ind.....	286,966	242,479	I. 44,487	18.3
Net.....	110,866	91,399	I. 19,467	11.2
Kentucky Cent.....	108,068	92,579	I. 15,489	16.7
Net.....	52,285	41,202	I. 11,083	26.9
Louis. & Nashv.....	1,369,561	1,196,284	I. 173,277	14.4
Net.....	552,464	507,279	I. 45,185	8.9
Memphis & Chas.....	139,087	119,375	I. 19,712	16.5
Net.....	21,584	46,181	D. 24,597	53.4
N. Y., L. E. & W.....	2,167,075	2,081,695	I. 85,380	4.1
Net.....	611,708	573,093	I. 38,615	6.7
N. Y. & N. E.....	393,854	379,543	I. 14,311	3.7
Net.....	164,000	157,490	I. 6,510	4.1
N. Y., Ont. & W.....	178,171	146,680	I. 31,511	21.4
Net.....	56,851	42,880	I. 13,971	32.5
N. Y., P. & Nor.....	40,267	32,369	I. 7,898	24.3
Net.....	9,082	5,582	I. 3,500	62.5
Norfolk & West.....	365,092	287,407	I. 77,685	27.0
Net.....	122,615	122,615	I. 48,696	39.7
Northern Central.....	608,628	502,027	I. 106,601	21.2
Net.....	219,102	198,731	I. 20,371	10.2
Northern Pac.....	1,299,586	1,226,358	I. 73,228	5.9
Net.....	601,906	638,933	D. 37,027	5.8
Pennsylvania.....	5,022,012	4,585,390	I. 436,622	9.5
Net.....	1,907,536	1,905,045	I. 2,491	0.1
Petersburg.....	27,589	25,837	I. 1,752	6.7
Net.....	672,615	9,398	I. 9,398	9.9
Phila. & Erie.....	381,051	349,521	I. 31,530	9.0
Net.....	146,761	144,554	I. 2,207	1.5
Rich. & Peterb.....	19,131	17,337	I. 1,794	10.3
Net.....	8,006	9,652	D. 1,646	16.9
Union Pacific.....	2,536,598	2,587,730	D. 51,132	1.9
Net.....	1,216,226	1,175,178	I. 41,048	3.4
Total (gross).....	\$16,468,637	\$15,173,982	I. \$1,294,655	8.5
Total (net).....	6,431,421	6,246,702	I. 184,719	2.9
Net.....	.....	.....	D. 83,292	1.3
Net.....	.....	.....	I. 98,427	1.5

Two months to August 31:	1887.	1886.	Inc. or Dec.	P. c.
Nash., C. & St. L.....	\$531,359	\$439,743	I. \$91,616	20.8
Net.....	253,729	192,383	I. 61,346	31.8

Three months—July 1 to Sept. 30:	1887.	1886.	Inc. or Dec.	P. c.
N. Y. C. & H. R.....	\$9,512,000	\$8,717,147	I. \$794,853	10.2
Net.....	3,432,000	3,839,472	D. 407,472	1.6

Eight months—Jan. 1 to August 31:	1887.	1886.	Inc. or Dec.	P. c.
Canadian Pac.....	\$6,412,262	\$6,080,893	I. \$331,369	5.4
Net.....	1,718,935	2,131,869	D. 412,934	19.3
Cl., C. & I.....	2,861,902	2,575,897	I. 286,005	11.1
Net.....	1,054,203	883,004	I. 170,599	19.3
Grand Rap. & I.....	1,888,989	1,562,488	I. 326,501	20.8
Net.....	626,637	468,669	I. 157,968	33.5
Kentucky Cent.....	672,615	501,610	I. 171,005	34.1
Net.....	272,869	201,610	I. 71,259	35.3
Mem. & Charles.....	1,024,125	809,544	I. 214,581	26.4
Net.....	175,387	202,532	D. 27,145	13.4
N. Y., L. E. & W.....	15,758,180	14,494,111	I. 1,264,069	8.7
Net.....	4,494,968	3,982,378	I. 512,590	12.8
N. Y. & N. E.....	2,601,009	2,515,873	I. 85,136	3.3
Net.....	842,266	859,860	D. 17,594	2.0
N. Y., Ont. & W.....	969,712	879,380	I. 90,332	10.3
Net.....	164,564	115,679	I. 48,885	42.4
N. Y., F. & Nor.....	346,033	281,365	I. 64,668	22.9
Net.....	62,440	45,793	I. 16,647	36.3
Norfolk & West.....	2,599,579	1,993,075	I. 606,504	30.4
Net.....	1,023,901	782,128	I. 241,773	30.9
Northern Central.....	4,226,557	3,533,889	I. 692,668	19.5
Net.....	1,669,319	1,218,698	I. 450,621	36.9
Northern Pac.....	7,949,510	7,316,641	I. 632,869	8.6
Net.....	3,063,329	3,363,726	D. 300,397	8.8
Pennsylvania.....	30,047,106	32,192,231	D. 2,145,125	6.6
Net.....	12,365,460	11,155,297	I. 1,210,163	10.8
Phila. & Erie.....	2,632,428	2,340,728	I. 291,700	12.5
Net.....	1,089,994	966,617	I. 123,377	12.7
Union Pacific.....	18,037,862	16,312,265	I. 1,725,597	10.5
Net.....	7,069,878	5,771,837	I. 1,298,041	22.4
Total (gross).....	\$104,573,437	\$93,464,594	I. \$11,108,843	11.8
Total (net).....	35,687,440	32,181,291	I. 3,506,149	10.9
Net.....	.....	.....	D. \$799,070	2.5
Net.....	.....	.....	I. 2,747,079	8.5

Nine months—Jan. 1 to Sept. 30:	1887.	1886.	Inc. or Dec.	P. c.
Chi. & Alton.....	\$1,737,893	\$1,292,267	I. \$445,626	34.6
Chi. & East. Ill.....	1,472,823	1,272,282	I. 200,541	15.7
Chi. M. & St. P.....	17,408,472	17,200,171	I. 208,301	1.1
Long Island.....	2,535,002	2,349,213	I. 185,789	7.9
Mexican Cen.....	3,435,057	2,681,003	I. 754,054	28.1
Norfolk & West.....	3,233,918	2,501,788	I. 732,130	29.2
Northern Pac.....	9,257,051	8,686,313	I. 570,738	6.5
St. L. & San F.....	4,343,682	3,595,992	I. 747,690	20.8
St. L., A. & N. M.....	371,801	256,343	I. 115,458	45.0
Wheeling & L. E.....	534,481	429,308	I. 105,173	24.4

Nine months—Jan. 1 to Sept. 30:					
Chi. & Alton....	\$1,737,893	\$1,292,267	I.	\$445,626	34
Chi. & East. Ill.	1,472,823	1,272,282	I.	200,541	15.

Association. This was immediately followed by a similar notice from the Wisconsin Central, and a Chicago dispatch of Sept. 30 stated that the Chicago, Milwaukee & St. Paul had followed with a notice of withdrawal from the Western Traffic Association. This last named move is in accordance with the well known policy of the St. Paul to attack the Burlington on Council Bluffs traffic, where the latter's business is comparatively heavy and its own is light, as the best means of retaliating for the injury which the Burlington does to the St. Paul traffic, where the conditions are reversed.

Long and Short Haul in the Northwest.

A St. Paul despatch of Sept. 29 stated that the Chicago, Milwaukee & St. Paul had announced an advance in rates on grain to Chicago from way stations south of St. Paul from 7½ to 12½ cents, thus making them higher than the through rate from St. Paul and Minneapolis. This is done, it was said, on the ground that water competition, from St. Paul via Duluth to Buffalo, justified the assumption that the Inter-state Commission would deem the conditions exceptional, and the rates therefore allowable under the fourth section.

A later report states that the action of the road was misunderstood, and that the advance in rates only applies on westbound freight from La Crosse and points north of there to St. Paul and Minneapolis. The advance is on the class which includes grain, but there is, of course, very little grain carried westward, the change being made on account of the other commodities included in the same class.

ANNUAL REPORTS.

Nashville, Chattanooga & St. Louis.

This company reports for the fiscal year ending June 30, 1887, the total line operated was 600 miles, an increase of 20 over last year. The increase was by the purchase of the Tracey City Branch. The equipment includes 73 locomotives and 2,060 cars of all classes. The locomotive equipment has diminished by 6; 12 having been sold, and 6 purchased. The latter, 10-wheelers, were charged to operating expenses. The narrow gauge equipment of the Centerville and Duck River branches includes six locomotives and 118 cars of all classes.

The balance sheet, condensed, is as follows:

Liabilities:	1886.	1887.
Capital stock.....	\$6,668,363	\$6,668,531
Funded debt.....	9,200,000	9,207,000
Floating debt.....	434,955	847,192
Interest.....	450,505	297,650
Profit and loss.....	1,571,014	1,803,147
	\$18,324,836	\$18,823,520
Assets:		
Cost of road.....	\$17,094,876	\$17,512,645
Stocks and bonds.....	478,715	479,083
Real estate.....	67,901	54,129
Cash.....	31,188	375,211
Supplies, etc.....	372,197	401,873
	\$18,324,836	\$18,823,520

The decrease in interest liabilities is from the payment of \$153,600 of coupons which matured between 1882 and 1886, and which were presented by the United States government.

After suits the company settled by payment of the original claim in six monthly payments from Jan. 1, 1887. The increase in the floating debt by \$412,237 is accounted for by the \$1,360,000 paid the United States as above and by advances to build branches, upon which bonds will be issued in November of this year when the branches are completed. These bonds have already been placed at a very satisfactory price, realizing above par, and the amount received upon their delivery will reduce the floating debt to less than \$300,000, which amount is accounted for by advances made to the Duck River Valley Railroad Co. for construction of the extension from Petersburg to Fayetteville, for which this company holds \$144,500 Duck River Valley Railroad bonds; and by the cost of seven and a half shares in lease of the Western & Atlantic Railroad, after deducting dividends received from this investment.

The bonded debt was reduced by the redemption of \$118,000 Nashville & Chattanooga bonds endorsed by the State of Tennessee and increased by the issue of \$125,000 main stem first mortgage bonds, net increase of \$7,000. The change will result in a small increase of interest charge as the new bonds bear 7 per cent. against 6 per cent. for those redeemed.

The results of operations for the last two fiscal years compared are as follows:

	1886-87.	1887-88.	Inc. or Dec.	P. c.
Freight.....	\$1,894,715	\$1,429,468	I. 465,247	32.5
Passengers.....	75,961	604,820	I. 121,141	20.0
Mails.....	54,997	56,472	D. 1,475	3.4
Rents, &c.....	98,575	96,850	I. 1,725	1.7
Total.....	\$2,774,448	\$2,188,110	I. 586,338	26.7
Op. expenses.....	1,578,611	1,322,858	I. 255,753	19.3
Net earnings.....	\$1,195,837	\$865,252	I. 330,585	38.1
Gross earnings per mile.....	4,624	3,773	I. 851	22.3
Net earnings per mile.....	1,993	1,492	I. 501	33.4
Per cent of exps.....	56.9	60.4	D. 3.5	

The income account is as follows:

Net earnings as above.....	\$1,195,837
Interest & taxes.....	\$709,834
Improvements.....	119,480
	829,314
Net surplus.....	\$366,323
Receipts from other sources.....	13,445
Increase in floating debt.....	412,237
" " bonded.....	7,000
" " capital stock.....	169
" " interest due.....	745
Total.....	\$799,919

Which is accounted for by:

Four quarterly dividends of 1 per cent. each paid.....	\$266,741
Nashville & Chattanooga Railroad Co. coupons, which matured during the year, paid the United States.....	153,600
Amount advanced for construction of branches.....	238,662
Increase in resources.....	80,915
Total.....	\$799,919

Traffic statistics for the year are as follows:

	1886-7.	1887-8.	Inc. or Dec.	P. c.
Pass.-train miles.....	591,770	547,804	I. 43,970	8.8
Freight-train miles.....	928,408	863,208	I. 65,200	7.1
Locomotive miles.....	2,039,970	1,843,430	I. 196,540	10.6
Pass.-car miles.....	3,094,902	2,670,213	I. 424,689	18.1
Freight.....	18,629,967	17,157,961	I. 1,472,006	8.4
Passengers carried.....	589,932	377,925	I. 212,037	56.1
Tons freight.....	1,655,830	1,004,935	I. 650,895	64.7
Ton miles.....	158,124,821	104,107,430	I. 54,017,391	51.8
Earnings per train-mile, cents.....	158.4	137.2	I. 21.2	1.5
Expenses per train-mile, cents.....	91.0	82.8	I. 8.2	
Net.....	67.4	54.4	I. 13.0	

* Main line.

The north-bound passenger traffic was 53 per cent. of the whole and the north-bound freight 43 per cent. of the whole. The average freight haul was 95 miles. Locomotive service cost 16.50 cents per mile run; passenger car repairs cost 1.629 per mile, and freight car repairs 0.601 per mile. The earnings per passenger train mile were 120.3 cents, per freight train mile 177.1 cents, and the average of all, 158.4 cents. The earnings per ton mile were 1.16 cents north and 1.22 cents south; average, 1.20.

Bridges and Trestles.—The light iron bridges at Lookout, Cave Creek, Widow's Creek, Nicajack, and five spans of the Tennessee River Bridge at Bridgeport are being taken down and replaced with new iron bridges of increased strength. The masonry under the first four bridges has been entirely rebuilt on account of damage sustained by the old piers from fire during the war. Besides this work, 395 feet of new iron bridge has been constructed over Elk River, 6,706 ft. of cedar pile, 7,108 ft. framed trestle built, and 9,320 ft. of trestle repaired, and 4 spans, 45 ft. Howe Truss bridge, built at Battle Creek, on Jasper Branch.

Steel Rails.—About 40 miles have been laid with 58-lbs. steel rail, and 361 miles of the 600 operated is now laid with steel of 52 or 58 lbs. section, 140 miles being of the 58 lb.

The purchase of the Tracey City Branch has been mentioned. The company agreed to issue and deliver to the Tennessee Coal, Iron & Railroad Co. in payment thereof 500 bonds of \$1,000 each, to be secured by a mortgage upon the property purchased, bearing 6 per cent. per annum interest, all dated Jan. 1, 1887, and payable in sums of \$20,000 per annum after five years from date until the entire issue is taken up. Under this agreement, the company took possession of the road Nov. 1, 1886, and has operated it since that time, the surplus for the eight months, after paying all expenses, interest and taxes, being \$9,252, which would indicate that, with the other advantages derived from the possession of the road, its purchase was a judicious investment.

"When your company took charge of this branch, its physical condition was very poor, requiring large expenditures in improving the track, reducing curves, etc."

To reimburse your company for the cost of these improvements, \$100,000 Nashville, Chattanooga & St. Louis 6 per cent. 30-year bonds will be issued, secured by a first mortgage upon the Tracey City branch, making the total cost of the road \$600,000 in 6 per cent. bonds.

"For a number of years the management of this company have thought it would be profitable to construct a railroad from Elora, on the Fayetteville Branch, to Huntsville, Ala., and when the citizens of Huntsville subscribed \$40,000, the right of way and grounds for terminal facilities at Huntsville, and the citizens of Nashville subscribed \$10,000 additional in aid of this enterprise, your directors deemed it advisable to accept the subscriptions and build the road at once. Work was begun about March 1 last, and the track will be completed to Huntsville during October next. The road is 26.8 miles long, making the distance from Nashville to Huntsville 130.3 miles. It is confidently expected that this connection with the great cotton producing region of North Alabama will be profitable in itself, besides increasing the receipts of the main line.

"This branch has been extended from Victoria to the Whitwell mines, a distance of 4 miles, for the purpose of rendering available the coal deposits of this section, from which the Tennessee Coal, Iron & Railroad Co. will ship from 200 to 300 tons of coal per day. It was thought to be the interest of this company to further extend the road up the Sequatchie Valley about 14 miles to Dunlap. The road is under contract, and will be finished by Nov. 1."

"This road should be further extended from Dunlap to Brush Creek, and up that creek to Tracy City, and also through Pikeville to the head of the valley, in Cumberland County."

"A contract was made with the Bon Air Coal, Land & Lumber Co., by which your company agreed to extend the McMinnville Branch from its terminus at Sparta, White County, Tenn., six and three-quarter miles to the coal fields of the Bon Air Coal Co., at Bon Air, Tenn., the last named company agreeing to spend \$50,000 in developing its coal, and guaranteeing shipments of not less than 200 tons of coal and coke daily upon a yearly average of 300 days each year, and to furnish the necessary funds to pay for the construction of the road as the work progresses, and take, upon its completion, Nashville, Chattanooga & St. Louis 6 per cent. 10-30 bonds, secured by mortgage upon the extension, at par, to an amount equal to the cost of the road and its equipment. Under this agreement, work was begun upon the road Feb. 1, and 4½ miles of grading have been completed and 3,500 ft. of track laid. The extension will be finished in December next."

"Surveys have been made looking to the extension of the Centerville branch from its present terminus at the Lewis County line southwardly about eighteen miles to extensive iron ore beds and timber lands on Allen's Creek, owned by parties who propose to erect two or more furnaces; and a preliminary line has also been run from Allen's Creek through Wayne County, which would develop large and valuable deposits of ore. Whenever bonds upon this road can be placed at a satisfactory price in advance of commencing the work, it is recommended that the 47 miles now in operation be changed to standard gauge and the extensions built through Lewis and Wayne counties."

"The gauge of the Duck River Railroad (3 ft.) is a great inconvenience to the patrons of the road, and a drawback to the development of the country through which it passes, so much so that a proposition was made in March last by the stockholders of the Duck River Valley Railroad to transfer to the Nashville, Chattanooga & St. Louis, by the 1st of September, 1887, all the stock in that company, and deliver its railroad and properties, in consideration of your company agreeing to make and equip said railroad standard gauge by Dec. 31, 1888, and operate the same as a part of the Nashville, Chattanooga & St. Louis system, pay \$5,500 of stock notes, and take care of the \$390,000 mortgage debt. Your directors accepted this proposition March 24, 1887, and it is to be submitted to a vote of the people of the city of Columbia and Marshall County, who own a controlling interest in the stock, Aug. 8 next (1887), and it is thought the proposition will meet with their approval."

"In October last your directors felt justified, from the earnings of the road, in commencing the payment of quarterly dividends of one per cent. upon the capital stock. This has been regularly declared since and, with the present receipts, can be continued and the floating debt liquidated in a short time, and it is hoped, with the continued prosperity of the country and the completion of the branch roads now in process of construction your revenues will be so augmented as to justify in the near future an increase to five per cent. per annum."

Cincinnati, Indianapolis, St. Louis & Chicago.

The annual report of this company for the year ending June 30, 1887, includes the statistics of but 298 miles, although the company operated 413 miles. The Kankakee & Seneca, 43 miles, is owned jointly with the Chicago, Rock Island & Pacific. The Verona, Greensburg & Rushville, 46 miles, is now operated for the benefit of the bond and stockholders. Although the operating company owns all of the bonds and over two-thirds of the stock, the accounts are kept separate, as are those of the Kankakee & Seneca. The Columbus, Hope & Greensburg, 26 miles, is also operated for the owners with separate accounts.

The equipment consists of 81 locomotives, 90 passenger, mail and baggage cars and 3,253 freight cars.

The general account was as follows:

Liabilities:	
Capital stock.....	\$7,000,000
Received from stockholders on account of subscription to new issue of stock.....	1,854,060
Mortgage bonds.....	9,035,750
Accounts payable.....	220,923
June pay rolls.....	89,858
Uncollected bond interest and dividends.....	49,429
Due sundry persons and companies.....	58,671
Profit and loss account.....	1,218,881
	\$19,527,571

Assets:	
Construction and equipment.....	\$13,811,662
Big Four grain elevator.....	215,758
Inds. Union Ry. Co. proprietary account.....	116,123
Bond redemption, premium and expense account.....	1,90,442
Sundry securities owned by company.....	3,149,031
Materials and supplies on hand.....	149,954
Advances to branch lines.....	327,382
Bills receivable.....	376,143
Due from sundry persons and companies.....	286,037
Bond interest and dividend funds on deposit at banks.....	40,545
U. S. Post-office department.....	28,368
Due from agents of the company.....	19,791
Cash.....	145,748

Total.....\$19,527,571

The refunding of old seven per cent. bonds into new four per cent. bonds has progressed. "In the last report the refunding of the old bonds was alluded to at length, and the fact stated that one million of new four per cent. bonds had been sold. Some months thereafter two million more of the new four per cent. bonds were exchanged by the company for an equal amount of old bonds. This left about seven million of old bonds outstanding. In February last, a contract was made with Drexel, Morgan & Co., by which they undertook to make the exchange and conversions as the agents of the company for a period of five years. * * * Although this contract was not made until late in February, the conversion has been pressed with such success and rapidity that at the writing of this report it is substantially completed. Five million three hundred and ninety-eight thousand of four per cent. bonds have already been issued. There are two millions of the old bonds that are still outstanding that fall due within the terms of the contract with Drexel, Morgan & Co., and which are therefore sure of being exchanged into fours. There are eight hundred and fifty-seven thousand of sixes, which are being rapidly exchanged for the fours, as the company has the right to call a certain number each year at 105 for the sinking fund, and this renders them an undesirable bond for investors to hold. This leaves only one million and three-quarters of old bonds out, which are of different issues and due at different times."

Starting with the present fiscal year the company has to provide out of earnings but \$400,000 for interest charges. When the refunding operations began the fixed charges were \$693,417.

To provide for the premiums for the exchange of bonds, and the purchase of lands and equipment, and the payment of necessary improvements, three millions of stock was issued to the stockholders of record at par, giving them credit, however, for a portion of the dividends that had been earned and not paid, and allowing them to take the new stock after that credit at 65 per cent. of its par value. All was taken except 600 shares, which was left over in the way of fractions and of stockholders who did not respond.

The earnings for the year were:

	1886-7.	1887-8.	Inc. or Dec.	P. c.
Freight.....	1,754,830	1,540,902	I. 213,928	13.8
Passengers.....	773,146	729,534	I. 43,612	5.9
Mail and express.....	156,746	155,977	I. 769	0.4
Total.....	2,684,723	2,426,413	I. 258,310	10.6
Expenses.....	1,641,611	1,480,491	I. 161,120	10.8
Net earnings.....	1,043,112	945,922	I. 97,190	10.2
Taxes.....	58,985	59,570	D. 585	0.9
Net less taxes.....	984,127	886,352	I. 97,775	11.0
Gross per mile.....	9,001	7,074	I. 1,927	27.1
Net.....	3,303	2,584	I. 719	27.6
P. c. of exps.....	59.63	63.5	D. 3.9	

The income account was:

Net earnings as above.....	\$984,127
Miscellaneous.....	64,170
	\$1,048,297
Bond interest.....	643,267
Miscellaneous.....	15,582
Dividends (4½ p. c.).....	352,500
	991,349
Surplus June 30, 1887.....	60,948
June 30, 1886.....	1,157,933
Total surplus.....	\$1,218,881

The changes in construction account have been:

Balance June 30, 1886.....	\$13,057,179
To purchase of miscellaneous real estate.....	\$4,125
" claims paid, account of L. C. & L. R. Co. 9,358	
" double track, new equipment, additional	
slings and sundry additions to property.....	211,000— 224,483
Balance June 30, 1887.....	\$13,281,662

The traffic for the year was:

	1886-87.	1887-88.	Inc. or Dec.	P. c.
Freight ton-miles.....	207,270,792	172,841,637	I. 34,429,155	10.92
Passenger miles.....	33,778,236	31,812,092	I. 1,966,144	6.17
Rate per ton mile, cents.....	0.84	0.88	Dec. 0.04	
Rate per pass. mile, cents.....	2.28	2.29	Dec. 0.01	

The contract for replacing all the wooden bridges of the main line with heavy iron structures that was mentioned in the last report has been nearly completed. A small portion will go into the present year. Sixty-nine hundred and seventy-six yards of heavy masonry have been built to take the place of that which was old and light. The plan of reducing grades and curvatures, wherever it could be done without too great expense, has been followed.

"Our arrangements for traffic and business with other lines have remained mutually satisfactory, except as to the Terre Haute & Indianapolis Railroad. The new management of that company threw off our trains for St. Louis, but as the Indianapolis & St. Louis at once gave us as good service, with more business, we were not troubled except by temporary annoyance. This would not be alluded to here at length, except that some of our stockholders have thought it was a serious blow to our business, when the fact is we always gave that company much more traffic than we received. This of course we can control, while the Indianapolis & St. Louis have a much better local line, and consequently have more paying traffic to give us in return."

"Since the close of the fiscal year the country tributary to our road has experienced a very severe drouth, which has materially injured the corn crop. This will tend to lessen our earnings somewhat the coming year, but will not be severely felt if general business continues good."